

SAN RAFAEL ROCK QUARRY AMENDED RECLAMATION PLAN AND AMENDED SURFACE MINING AND QUARRYING PERMIT

Combined Final Environmental Impact Report (FEIR)
SCH#s 2005102122 (Amended Reclamation Plan)
2007082097 (Amended Quarry Permit)

FEIR Volume I: Revisions to the Draft EIR Text

Prepared for:
Marin County
Community Development Agency

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CHAPTER 1

Introduction

1.1 Marin County Planning and Project Review Process

This document is a combined Final Environmental Impact Report (Final EIR) for two closely related projects at the San Rafael Rock Quarry (SRRQ): an Amended Reclamation Plan (ARP) and an Amended Surface Mining and Quarrying Permit (AQP). The Final EIR evaluates the potential for each project to result in adverse effects on the physical environment. Analysis of the two projects is being combined in a single EIR document in order to enable an expeditious and efficient public review process. The California Environmental Quality Act (CEQA) *Guidelines* §15165 authorizes the lead agency to prepare a single EIR for two or more separate projects where “one project is one of several similar projects” even when they are not part of the same project. Marin County determined on preliminary review that an EIR was required for the ARP and proceeded with preparation of that EIR. In the interim, the County prepared and circulated an Initial Study for the AQP separate from the ARP (Marin County, 2007). The County determined on the basis of the Initial Study that an EIR is also required for the AQP.

The County of Marin prepared and circulated Notices of Preparation (NOP) of an EIR for each project pursuant to §15082 of the California Environmental Quality Act (CEQA) *Guidelines*¹ to seek comments from affected agencies and the public about the scope of the EIRs. The date of the NOP for the ARP was October 26, 2005, and the date of the NOP for the AQP was August 17, 2007, subsequent to preparation of an Initial Study and determination that a focused EIR was required for the project; both NOPs are included in Appendix F. Several comment letters and oral comments were received from individuals and from interested governmental agencies in response to the NOPs. The County of Marin held public scoping sessions (meetings) regarding the proposed projects on January 25, 2006 for the ARP and on September 12, 2007 and October 3, 2007 for the AQP. The public scoping sessions were held to help identify potentially significant environmental effects to be analyzed in depth in the EIRs. Numerous oral comments were received at the scoping meetings, and additional written comments were received at and following the meetings. Comment letters on the NOPs and comments from the public scoping meetings are contained in Appendix G, together with an indication of where in the document issues raised are discussed.

Marin County circulated the Draft EIR for review by public agencies, interested parties, and organizations for a 60-day public review period, in accordance with State CEQA *Guidelines* §15087. Written comments were accepted through April 14, 2008, the closing day of the review

¹ California Code of Regulations Title 14, Division 6, Chapter 3.

period. Oral and written comments were also accepted at a hearing by the County Board of Supervisors (BOS) held on March 25, 2008.

As required by CEQA *Guidelines* §15088, the County has evaluated all comments received on the environmental issues, and has prepared written responses. The comments and responses are included in the Final EIR in Volume II, Chapter 7. Revisions to the EIR text necessitated by the response to comments are included in the responses, and are also shown in Chapters 2 through 6 in Volume I, Revisions to the Draft EIR.

Pursuant to County environmental review procedures, the County will circulate the Final EIR to Responsible and Trustee Agencies that commented on the Draft EIR and all interested parties for a 45-day review of the adequacy of the response to comments. Upon the conclusion of the review, the BOS will consider whether to certify the Final EIR. In certifying the EIR, the BOS would be affirming that the EIR is adequate and complete pursuant to CEQA and the County Environmental Review Guidelines. In conjunction with a decision on the projects, the BOS would also find that it reviewed and considered the information contained in the Final EIR prior to taking action on the projects (CEQA *Guidelines* §15090).

No action can be taken to approve the proposed projects until the Final EIR has been certified. However, certification of the EIR does not require nor ensure approval of the projects. Once the EIR is certified, the BOS may consider approval of the projects. At that time, the BOS may decide to approve one or both of the projects, with mitigation measures specified in the Final EIR incorporated as conditions of approval; to disapprove one or both of the projects; or to approve an alternative to one or both of the projects that has been evaluated in the Final EIR.

1.2 Scope of the EIR

With regards to the ARP, the EIR is limited to evaluation of environmental impacts associated with activities covered by the applicant's proposed 2004 Amended Reclamation Plan (ARP04), as these activities differ from the adopted 1982 Amended Reclamation Plan (ARP82). For the AQP, the EIR is limited to examination of proposed changes to the existing Surface Mining and Quarrying Permit, which was issued by Marin County pursuant to County Code Chapter 23.06 and the California Surface Mining and Reclamation Act of 1975 (SMARA).

Amended Reclamation Plan

Preparation of a reclamation plan, and amendment of this plan to ensure its consistency with current and planned operations and post-reclamation use of the site, are requirements of both the Marin County Code and SMARA. Under SMARA, all operators of surface mines in California must prepare and submit for approval by the lead agency a reclamation plan, along with financial assurances that sufficient funds would be available to accomplish reclamation (Public Resources Code [PRC] §2770). The lead agency under SMARA is the jurisdiction with land use authority over the surface mining operation – in this case the County of Marin. Substantial deviations from an approved reclamation plan may not be undertaken without the submission to and approval by the lead agency of amendments to the reclamation plan (PRC §2777). Under SMARA, each lead

agency must adopt a surface mining ordinance which establishes procedures for the review and approval of reclamation plans and financial assurances, and for issuance of permits to conduct surface mining operations (PRC §2774). Marin County has adopted the required ordinance and it is codified as Title 23, Chapter 23.06 of the Marin County Code.

SMARA (PRC §2733) defines “Reclamation” as the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations, so that mined lands are reclaimed to a usable condition which is readily adaptable for alternate land uses and creates no danger to public health or safety. The process may extend to affected lands surrounding mined lands, and may require backfilling, grading, resoiling, revegetation, soil compaction, stabilization, or other measures.

The following activities are considered reclamation:

- Establishment of final reclamation grades;
- Stockpiling of topsoil and other materials for future use in site reclamation, including loading and hauling of material to stockpiles for this purpose;
- Planning of post-reclamation uses of the Quarry site.

Amended Surface Mining and Quarrying Permit

The primary permit related to the operation of the San Rafael Rock Quarry is Surface Mining and Quarrying Permit No. Q-72-03, issued by Marin County in 1972 pursuant to County Code Chapter 23.06 (County of Marin, 1972). SRRQ’s proposed amendments to their permit, which are contained in a letter from Dutra Materials, the parent company of SRRQ, to the Marin County Department of Public Works dated October 27, 2004, and further clarified by a letter dated December 14, 2004 (Dutra Materials, 2004a, 2004b), apply to SRRQ’s ongoing quarrying and related production operations.

The following activities are considered a part of ongoing quarry operations, and are considered a part of the AQP project:

- The activities described and proposed in the project application;
- Removal of topsoil and overburden to expose the mineral resource for quarrying;
- Management of mining wastes and overburden unrelated to reclamation;
- Blasting and extraction of quarry products;
- Importation of San Francisco Bay sand;
- Crushing, processing, stockpiling prior to shipment offsite, loading, and shipping offsite of quarried materials, including by truck or barge;

- Operation of an asphaltic concrete batch plant;
- Operation of a truck wash system for washing quarry product transport trucks prior to leaving the facility;
- Maintenance and servicing activities at the quarry site. “Maintenance activities” include repair, replacement, and failure preventative measures of on-site facilities, fixed plants, spring lines, vehicles, and stationary and mobile equipment related to overall, ongoing quarry activities;
- Wholesale sale of quarry products;
- Operation of the Quarry during state and local emergencies.

In June, 2007, Marin County published an Initial Study for the AQP pursuant to CEQA (Marin County, 2007). The purposes of an Initial Study are to review the potential environmental effects of a proposed project, to determine whether identified significant environmental impacts can be mitigated, and, based on this determination, to inform a decision whether to prepare an Environmental Impact Report for the project (CEQA *Guidelines* §15063(c)). The Initial Study for the AQP identified several potentially significant environmental impacts of the AQP, which require further study in an EIR. In addition, the Initial Study identified several impacts that would be significant without mitigation, which are further considered in this Final EIR. Comments received in response to the NOP and during public scoping sessions did not reveal additional impacts that require consideration in an EIR. Therefore, only those issue areas in which potentially significant impacts, or impacts requiring mitigation, are included in the impact analysis in Chapter 4 of this Final EIR. The following issue areas are examined in this Final EIR with respect to the AQP project:

- Land Use and Planning;
- Air Quality;
- Biological Resources;
- Hazards;
- Noise and Vibration;
- Aesthetics/Visual Resources;
- Cultural Resources.

In addition to its current Amended Reclamation Plan and Surface Mining and Quarrying Permit, SRRQ operates under the terms of various other permits. These permits, and any revisions to them necessary to maintain consistency with the projects, are noted in Chapter 3, Project Description.

1.3 Approach to Analysis

The principal purpose of an EIR is to inform the public and decision makers of the potential effects of a proposed project on the physical environment. With an existing facility that is seeking to amend its existing permits, however, both the project, and the baseline against which impacts are to be measured, must be defined carefully to avoid confusion and to ensure that the environmental analysis properly focuses on the proposed changes that constitute the project.

An EIR must include a description of the “environmental setting” of a project (CEQA *Guidelines*, §15125(a)). The “environmental setting” is defined as “the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation is published.... This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (ibid).

A project applicant’s existing entitlements to use its property are considered part of the “environmental setting,” as verified by a California Court of Appeal decision. In *Fairview Neighbors v. County of Ventura*,² the Court held that an EIR properly considered a quarry operator’s existing mining entitlement as part of the “environmental setting,” including an entitlement to generate the number of truck trips per day necessary to haul the maximum amount of material that the quarry was entitled to extract. The Court held that “the traffic generated when the mine operates at full capacity pursuant to the entitlement previously permitted” was an appropriate baseline, and rejected the petitioners’ argument that the baseline should consist of the number of truck trips actually running at the time the quarry submitted its new permit application. In other words, the maximum number of truck trips allowed under the existing permit, and not the actual number then operating, was properly considered the baseline.

Consistent with the CEQA statute, *Guidelines*, and case law, and with the decisions of the Marin County Superior Court (Marin County Superior Court, 2004), the SRRQ projects that are the subject of this Draft EIR are defined as the scope of activities contemplated by the proposed amendments to the existing Surface Mining and Quarrying Permit and Amended Reclamation Plan, to the extent that they differ from or exceed existing permitted conditions. Existing permitted conditions include the explicit terms and conditions of the 1972 Surface Mining and Quarrying Permit and the 1982 Amended Reclamation Plan, as well as other permits that SRRQ currently holds. They also include, and are limited to, the scope of the permitted use at the time the zoning for the property changed in 1982, when quarrying became a legal, non-conforming use (Marin County Superior Court, 2004). The impacts of the proposed changes must be evaluated in relation to the existing environment at the time of the NOPs for the projects.

In summary, the impacts to be considered are those which could potentially occur due to the changes proposed in the proposed ARP and in the application for an Amended Surface Mining and Quarrying Permit, as described in Chapter 3, Project Description, and as compared to existing permitted conditions. These impacts will be evaluated in relation to the existing environment at the time of the NOPs.

² *Fairview Neighbors v. County of Ventura*, 70 Cal. App.4th 238 (1999).

1.4 Documents Incorporated by Reference in the EIR

An EIR may, "...incorporate by reference all or portions of another document which is a matter of public record or is generally available to the public" (CEQA *Guidelines* §15150). Portions of the documents that are relevant to the environmental analysis for the proposed project have been summarized in various sections throughout this Draft EIR, and are described below. All referenced documents are available at the Marin County Community Development Agency, 3501 Civic Center Drive, Room 308, San Rafael, California, 94903.

City of San Rafael, *Peacock Gap Neighborhood Plan*, prepared by the City of San Rafael and John Roberto Associates, adopted by the San Rafael City Council on December 15, 1980.

Cornwell, AI, CSW/Stuber-Stroeh Engineering Group, Inc., letter to Rachel Warner, Marin County Community Development Agency, re: San Rafael Rock Quarry Amended Surface Mining and Quarry Permit Initial Study Comments, August 11, 2006 (2006a).

Cornwell, AI, CSW/Stuber-Stroeh Engineering Group, Inc., letter to Rachel Warner, Marin County Community Development Agency, re: San Rafael Rock Quarry, August 25, 2006 (2006b).

Cornwell, AI, CSW/Stuber-Stroeh Engineering Group, Inc., letter to Rachel Warner, Marin County Community Development Agency, re: San Rafael Rock Quarry Data Needs List, September 1, 2006 (2006c).

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County of Marin, Board of Supervisors, *Resolution of the Board of Supervisors of the County of Marin to Adopt the Peacock Gap Neighborhood Plan*, Resolution No. 81-253, August 18, 1981.

County of Marin, Department of Public Works, *Surface Mining and Quarrying Permit, issued to Basalt Rock Company, Inc.* Permit No. Q-72-03, Issued April 10, 1972.

County of Marin, Division of Environmental Services, *Initial Study and Negative Declaration, Amended Reclamation Plan for McNears Quarry*, Filed December 22, 1982(a).

County of Marin, Planning Commission, *Minutes of the Planning Commission Meeting, Item 8: Basalt Reclamation Plan*, December 6, 1982(b).

County of Marin, *Surface Mining and Quarrying Ordinance #1844*, Marin County Code Section 23.06.10, adopted 1972.

County of Marin, Community Development Agency, *San Rafael Rock Quarry Amended Surface Mining and Quarrying Permit Initial Study*, prepared by Environmental Science Associates, June 2007.

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1.5 Organization of the Final EIR

This Final EIR is organized into three volumes and eight chapters, preceded by the Table of Contents. A brief summary of the contents is presented below.

Volume I: Revisions to the Draft Environmental Impact Report

Volume I includes revisions to chapters 1-6 of the Draft EIR. Revisions are made in response to comments received and to respond to new information that has come to light since publication of the Draft EIR, as detailed in Chapter 7, Comments and Responses. Additional revisions correct typographical errors or errant cross-references discovered in the text of the Draft EIR after publication, or refine discussions and resolve internal inconsistencies. Revisions to the text of the Draft EIR are shown as follows:

- Additions to the text of the Draft EIR are underlined;
- Deletions of the text of the Draft EIR are shown as ~~strikeout~~.

Some changes to the Draft EIR have resulted in a shifting of text from one page to the next. In order to maintain the original pagination of the Draft EIR, this version places carried-over text on a separate page which is designated “a”. Thus, the extra page after page 4.2-52 is designated 4.5-52a.

Chapter 1 – Introduction: The Introduction describes the Marin County planning and project review process as it pertains to the proposed projects, presents the technical documents that are incorporated by reference into the EIR (in accordance with CEQA *Guidelines* §15050), and describes the organization of the document. The Introduction also includes a glossary of terms and list of acronyms used in the Final EIR.

Chapter 2 – Summary: The Summary, prepared in accordance with CEQA *Guidelines* §15123, contains an overview of key elements of the Final EIR and a summary of all sections mandated by CEQA for inclusion in the summary. The summary includes an abstract of the project descriptions, and an overview of the objectives of each project. A comprehensive overview of all environmental impacts and mitigation measures, along with the level of significance before and after mitigation, is presented in a table format for reader convenience. This chapter also summarizes the alternatives considered for each project, and describes how the environmental impacts of each alternative compare to the project as proposed. Summaries of growth-inducing impacts, irreversible environmental changes, and significant and unavoidable impacts for each project are also provided in this chapter. The summary chapter presents major conclusions of the Final EIR, areas of controversy, issues remaining to be resolved, and a summary of the consistency of each project with relevant plans and policies.

Chapter 3 – Project Descriptions: The project descriptions are prepared pursuant to CEQA *Guidelines* §15124. The description of each project is presented separately. This chapter includes an overview of each project, a common description of the project site and surroundings, a discussion of objectives for each project, and a discussion of the characteristics of each project. Information is

presented in text, figures, and tables. The project descriptions form the basis for the environmental impact analysis that follows.

Chapter 4 – Environmental Setting, Impacts, and Mitigation Measures: The majority of the environmental impact analysis for the proposed projects is contained in Chapter 4. The chapter is divided into “environmental issue areas” such as Air Quality, Transportation and Traffic, and Biological Resources. For each environmental issue area, there is a description of the relevant physical and regulatory setting. The setting includes the existing physical characteristics of the site and its surroundings, as well as the laws and regulations pertinent to this environmental issue area under consideration. Following the setting, there is a discussion of “significance criteria.” The significance criteria establish thresholds that define the extent of physical change attributable to a project beyond which a significant impact would occur. Within each environmental issue area, there is a separate discussion of impacts for each of the two projects. Mitigation measures, the efficacy of the mitigation measures for reducing an impact to a less than significant level, and draft mitigation monitoring and reporting requirements, are included for any significant impact that would result with the proposed projects. Following the discussion of impacts attributable to each of the two projects, there is further consideration of the potential for cumulative impacts of the two projects combined. The social and economic effects of the proposed projects are not evaluated as environmental issues in the EIR: the CEQA *Guidelines* state that social and economic effects “shall not be treated as significant effects on the environment” (CEQA *Guidelines* §150131[a]). Therefore, although the EIR may discuss economic or social information in the context of an environmental issue, the EIR focuses on the potential change on the physical environment that may result with the proposed project.

Environmental impacts are numbered throughout this portion of the EIR, beginning with the chapter and section number, followed by sequentially numbered impacts. All of the impacts for each of the two projects is given a distinguishing letter: “R” for impacts that would result from approval of the ARP, and “P” for impacts that would result from approval of the AQP. For example, the first ARP impact in Section 4.6 (Land Use and Planning) is impact number R4.6.1, and the second impact in this section for the ARP is R4.6.2. AQP impacts are numbered sequentially following the ARP impacts. Mitigation measures are numbered to correspond to impacts; therefore, mitigation measures that address Impacts R4.6.1 and R4.6.2 are designated Mitigation Measures R4.6.1 and R4.6.2. Following consideration of impacts for each of the two projects, the potential for the two projects to combine to create cumulative impacts is considered. Cumulative impacts are given the letter designation “C.”

For each significant impact requiring mitigation, there is also a brief discussion of how the specified mitigation measures will be monitored and the results reported, and with whom this responsibility lies. Mitigation Monitoring and Reporting Measures are given numbers corresponding to the related impact.

Chapter 5 –Growth Inducing and Cumulative Effects: Chapter 5 includes CEQA-mandated sections examining the potential growth-inducing effects of the projects and the projects’ potential to combine with other past, present, or foreseeable future projects to create cumulative

impacts (CEQA *Guidelines* §15355). Cumulative impacts refer to two or more individual effects that, when considered together, are considerable or compound other environmental impacts. The cumulative impact analysis is considered a particularly important component of this EIR, due to the format used, in which the impacts of each project are considered separately. Cumulative impacts of the two projects combined are considered within each topical impact section in Chapter 4. Chapter 5 further explores the potential for cumulative impacts of the ARP and AQP combined with other projects in the vicinity of the project.

Chapter 6 – Alternatives to the Project: In accordance with CEQA *Guidelines* §15126.6, Chapter 6 of the EIR presents a range of reasonable alternatives to each of the projects designed to feasibly attain most of the basic objectives of the project and avoid or substantially reduce significant project effects. The potential environmental impacts of the alternatives are discussed in comparison to the impacts that would result from the proposed project. While alternatives for each project are presented and analyzed separately, the inter-related nature of the projects is recognized in the formulation and analysis of the alternatives. For example, alternatives for reclamation may require alterations to planned mining operations.

Volume II: Comments on the Draft EIR and Responses

Chapter 7 – Comments and Responses: This chapter includes all comments received on the Draft EIR and responses to all comments. “Master Responses,” which combine responses to numerous comments addressing the same issue or topic, are presented in Section 7.2; responses to individual comments are included in Section 7.3.

Chapter 8 – EIR Authors, Persons and Organizations Contacted: This chapter identifies the individuals who were involved in the preparation of the Final EIR.

Volume III: Appendices

Appendices: This document contains several appendices of technical or procedural materials that are pertinent to the analysis contained in the body of the document. See the Table of Contents for the full list of appendices. In several instances, appendices have been updated or corrected from the Draft EIR. This includes corrections to the text of Appendix D, Health Risk Assessment, Section B (Health Risk Assessment Methodology and Assumptions) and a new version of Section C (Air Quality and Health Risk Assessment Calculations) that is better organized and labeled, and so easier to access. Also, corrections have been made to Table E-1 in Appendix E, Biological Resources, in response to a comment.

1.6 Glossary and List of Acronyms

Technical Terms Used in the Text³

303(d) List	List of impaired water bodies published by each state and approved by U.S. Environmental Protection Agency (USEPA) pursuant to the federal Clean Water Act.
Aquifer	A water-bearing rock formation.
Clean-blasting	The use of techniques to minimize over-break beyond designated boundaries. Several controlled blasting techniques are employed at SRRQ which include: line drilling, cushion blasting, and pre-splitting. Same as “controlled blasting.”
Controlled Blasting	See Clean-blasting.
Cushion blasting	A method of blasting in which an airspace is left between the explosive charge and the stemming, or in which the shothole is of substantially larger diameter than the cartridge.
Final Development Plan	A plan for design of the post-reclamation development of the project site specified in both ARP82 and ARP04. The final Development Plan is due to be submitted by SRRQ to Marin County three years prior to the anticipated cessation of mining activities.
Graywacke	An old rock name that has been variously defined but is now generally applied to a dark gray, firmly indurated, coarse-grained sandstone that consists of poorly sorted, angular to subangular grains of quartz and feldspar, with a variety of dark rock and mineral fragments embedded in a compact clayey matrix having the general composition of slate and containing an abundance of very fine-grained illite, sericite, and chloritic minerals.
Hydromulch	A planting technique in which specialized equipment is used to apply a mixture of water, mulch, seed, and fertilizer, often used for erosion control at construction sites.
Line drilling	A term used in quarrying to describe the method of drilling and broaching for the primary cut. In this method, deep holes are drilled close together in a straight line by means of a reciprocating drill mounted on a bar. The webs between the holes are removed with a drill or a flat broaching tool; thus a narrow continuous channel cut is made; controlled blasting.
Over-break	Excessive breakage of rock beyond the desired excavation limit.

³ Several of the definitions of mining terms are taken from the “Dictionary of Mining, Mineral, and Related Terms,” originally compiled by the US Bureau of Mines and published online by EduMine; available at: <http://www.infomine.com/dictionary/welcome.asp>

Overburden	Designates material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials, ores, or coal--especially those deposits that are mined from the surface by open cuts.
Pre-splitting	A smooth blasting method in which cracks for the final contour are created by blasting prior to the drilling of the rest of the holes for the blast pattern. Once the crack is made, it screens off the surroundings to some extent from ground vibrations in the main round.
Shot hole	The borehole in which an explosive is placed for blasting.
Stormwater Management Plan	A site or facility-specific plan to manage stormwater runoff, required for certain facilities or activities under the National Pollutant Discharge Elimination System (NPDES).
Stormwater Pollution Prevention Plan	A site or facility-specific plan to reduce water pollution from stormwater required for certain facilities or activities under the NPDES.
Tackifier	As used herein, an agent used to increase adhesion of hydromulch slurry to slopes.
Toxic Air Contaminant	California State law defines TACs as air pollutants having carcinogenic or non-carcinogenic health effects. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner).

List of Acronyms Used in the Text

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AB 32	Assembly Bill 32
ABAG	Association of Bay Area Governments
ACE, ACOE	U.S. Army Corps of Engineers
AEL	Acceptable Exposure Level
amsl	above mean sea level
APN	Assessor's Parcel Number
AQAP	Air Quality Attainment Plan
AQP	Amended Surface Mining and Quarrying Permit
ARP	Amended Reclamation Plan
ARP04	2004 Amended Reclamation Plan
ARP82	1982 Amended Reclamation Plan
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BCDC	Bay Conservation and Development Commission
bgs	below ground surface
BMP	Best Management Practice
BOS	Board of Supervisors
BSC	California Building Standards Commission
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CALINE	California Line Source Dispersion Model
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Dept. of Conservation, Division of Mines & Geology
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH ₄	Methane
CNDDB	California Natural Diversity Database
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CRHR	California Register of Historic Resources
CUP	County Conditional Use Permit
CUPAs	Certified Unified Program Agencies
CWA	Clean Water Act
DMMO	Dredged Material Management Office

DOC	Department of Conservation
DOT	Department of Transportation
DPM	Diesel Particulate Matter
DPS	Distinct Population Segments
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
eCO ₂	Carbon Dioxide equivalent (global warming potential)
EIR	Environmental Impact Report
EFH	Essential Fish Habitat
Fed/OSHA	Federal Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
GHGs	Greenhouse Gases
gpm	gallons per minute
HAP	Hazardous Air Pollutant
HF	Hydrogen Fluoride
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMMP	Hazardous Materials Management Plan
hp	Horsepower
HRA	Health Risk Assessment
HSWA	Hazardous and Solid Waste Act
H:V	Ratio of Horizontal to Vertical (as in a slope)
HWCL	Hazardous Waste Control Law
HWMP	Hazardous Waste Management Plan
LOS	Level of Service
LUST	Leaking Underground Storage Tanks
MACT	Maximum Achievable Control Technology
mcy	million cubic yards
MEI	Maximum Exposed Individual
MLLW	Mean Lower Low Water
MMI	Modified Mercalli Intensity
MRZ	Mineral Resource Zones
MSCPs	Multi-Species Habitat Conservation and Open Space Plans
MSHA	Mine Safety and Health Administration
msl	mean sea level
mty	million tons per year
NA	Not Available
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NIH	National Institutes of Health
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NOV	Notice Of Violation
NPDES	National Pollutant Discharge Elimination System

NPL	National Priority List
NRC	Nuclear Regulatory Commission
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
OEHHA	California Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OMR	Department of Conservation's Office of Mine Reclamation
OSHA	Occupational Safety and Health Administration
OTC	Order to Comply
Pb	lead
PGA	Peak Ground Acceleration
PM-10	Particulate Matter equal to or less than 10 microns
PM2.5	Particulate Matter less than 2.5 microns
ppb	parts per billion
ppm	parts per million
PRC	Public Resources Code
PTO	Permit To Operate
REL	Relative Exposure Level
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SLC	State Lands Commission
SLIC	Spills, Leaks, Investigations, and Cleanups Report
SMARA	Surface Mining and Reclamation Act
SMGB	State Mining and Geology Board
SO ₂	Sulfur Dioxide
SO _x	Sulfur Oxides
SOI	Sphere of Influence
SPCC	Spill Prevention Control and Countermeasure Plan
SRRQ	San Rafael Rock Quarry
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants
UBC	Uniform Building Code
USACE	U.S. Army Corps of Engineers
USBM	U.S. Bureau of Mines
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOCs	Volatile Organic Compounds
WDP	Waste Discharge Permit
WQC	Water Quality Certification

References – Introduction

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- Norman T. Gilroy and Associates, *Amended Reclamation Plan for McNears Quarry, Marin County, California*, prepared for Basalt Products, a Division of Dillingham Construction Co. February 1982.

CHAPTER 2

Summary

Introduction

This summary section is provided in accordance with State CEQA *Guidelines* §15123. As stated in the State CEQA *Guidelines* §15123(a), “[a]n EIR shall contain a brief summary of the proposed action and its consequences. The language of the summary should be as clear and simple as reasonably practical.” State CEQA *Guidelines* §15123(b) states, “[t]he summary shall identify: (1) Each significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect; (2) Areas of controversy known to the Lead Agency including issues raised by agencies and the public; and (3) Issues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects.” Accordingly, this summary includes a brief synopsis of the proposed projects and project alternatives, environmental impacts and mitigation measures, cumulative effects and mitigation measures, areas of known controversy, and issues to be resolved in the Environmental Impact Report (EIR). Table 2-2, at the end of this chapter, presents the summary of potential environmental impacts, their level of significance before mitigation, mitigation measures, and levels of significance with mitigation.

Summary of Impacts and Mitigation Measures

Chapter 4 (Environmental Setting, Impacts, and Mitigation Measures) describes in detail the environmental impacts that would result from implementation of the proposed projects. Impacts of a proposed project may be classified as either (1) less than significant (adverse effects that are not substantial according to CEQA); (2) significant (substantial or potentially substantial adverse changes in the environment, for which mitigation measures must be recommended, if feasible); or (3) significant and unavoidable (substantial or potentially substantial adverse changes in the environment that cannot feasibly be reduced with mitigation measures to a less-than-significant level). Significant unavoidable adverse impacts, growth-inducing impacts, and significant irreversible environmental changes that would occur with implementation of the proposed project are discussed below. Growth-inducing and cumulative impacts of the project are discussed in Chapter 5.

Table 2-2, at the end of this chapter, summarizes the project’s environmental impacts (including cumulative impacts), the level of significance before mitigation, mitigation measures, and the level of significance after mitigation. Please refer to Chapter 4, Environmental Setting, Impacts, and Mitigation Measures, and Chapter 5, Growth-Inducing and Cumulative Effects, for a detailed discussion of these issues.

Summary of Project Description

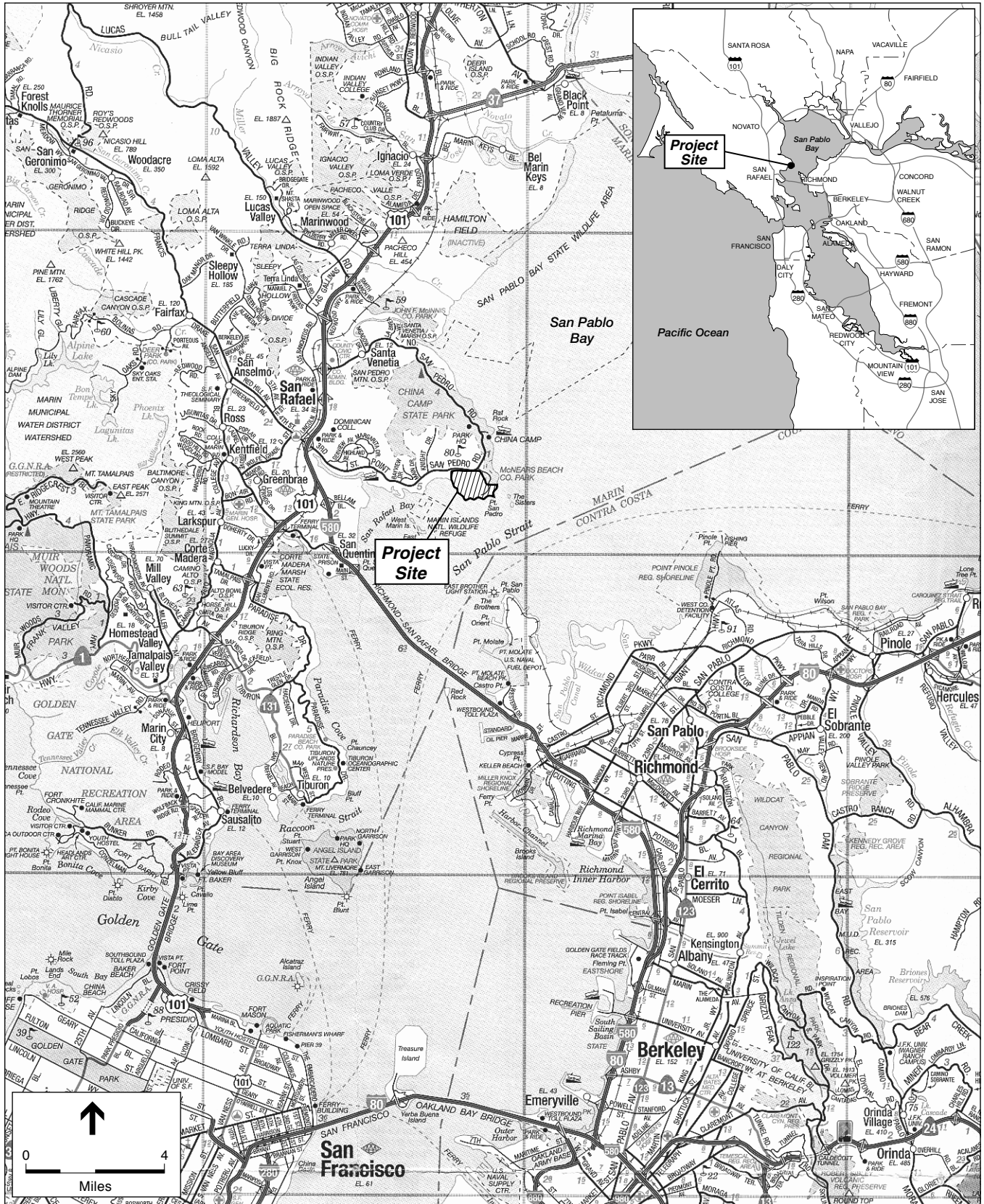
This ~~Draft~~ Final EIR examines the potential for adverse environmental impacts of two closely related projects involving the San Rafael Rock Quarry: a revised Amended Reclamation Plan (ARP) and an Amended Surface Mining and Quarrying Permit (AQP). The San Rafael Rock Quarry (SRRQ) is located at 1000 Point San Pedro Road (the “project site”) in an unincorporated area of Marin County, near Point San Pedro (Figure 2-1). SRRQ is a subsidiary of the Dutra Group; the acronym SRRQ in this report refers both to the applicant and to the physical Quarry site. The project site is bounded on the north by Point San Pedro Road, and on the south, east, and west by San Francisco Bay. The Peacock Gap Neighborhood, consisting primarily of single family homes, townhouses, and a golf course, is located immediately across Point San Pedro Road from SRRQ. The Marin Bay Park development and McNear’s Beach County Park are located adjacent to the property on its northeastern border. The Quarry is accessed by private roads that intersect with Point San Pedro Road, and regionally by U.S. 101.

For planning purposes, the site is divided into four quadrants (Figure 2-2). Hard rock quarrying of the site’s Franciscan sandstone is confined to the Southeast Quadrant (SE Quadrant) and the Southwest Quadrant (SW Quadrant). The SE Quadrant also features a processing plant and asphalt batching plant, as well as a dock to allow shipping of quarry products by barge. SRRQ’s offices and a residence on South Hill are located in the SW Quadrant. The Northwest Quadrant (NW Quadrant) is the location of McNear Brick Company (also referred to as McNear’s Brickyard in this document) and Marin Exposed Aggregate Manufacturing, which occupy these areas under lease. A substantial portion of the NW Quadrant is occupied by marshes. The Northeast Quadrant (NE Quadrant) contains the “brick resource area” where shale and clay deposits were formerly mined for use in the brick making operation. The NE Quadrant also includes stockpiles of overburden and pond fines from the quarrying operation, and areas left in a relatively natural state.

Amended Reclamation Plan

The ARP, which was submitted to Marin County in 2004 (and therefore referred to as “ARP04” in this EIR) describes SRRQ’s plans for completion of mining activities on the project site, and reclamation of the site in preparation for beneficial end uses. Marin County approved SRRQ’s existing Amended Reclamation Plan (ARP82) in 1982. Preparation and approval of a reclamation plan is a requirement of the state Surface Mining and Reclamation Act (SMARA) and Marin County’s Surface Mining and Reclamation Ordinance (SMARO). New, refined, or more detailed elements of ARP04 that distinguish it from ARP82, and which are examined in this EIR, include the following:

1. SRRQ proposes to carry out reclamation in four phases. Most reclamation would occur during the remaining operational life of the Quarry, instead of at the end of quarrying activities, as contemplated in ARP82. Some reclamation activities would occur after the end of mining operations. The phases would occur approximately as follows: Phase 1: years 0 to 6; Phase 2, years 4 to 10; Phase 3, years 8 to 14; Phase 4, years 11 to 17. As with ARP82, as part of reclamation the Main Quarry Bowl would be connected to San Francisco Bay to form a deep water harbor.



SOURCE: California State Automobile Association; ESA

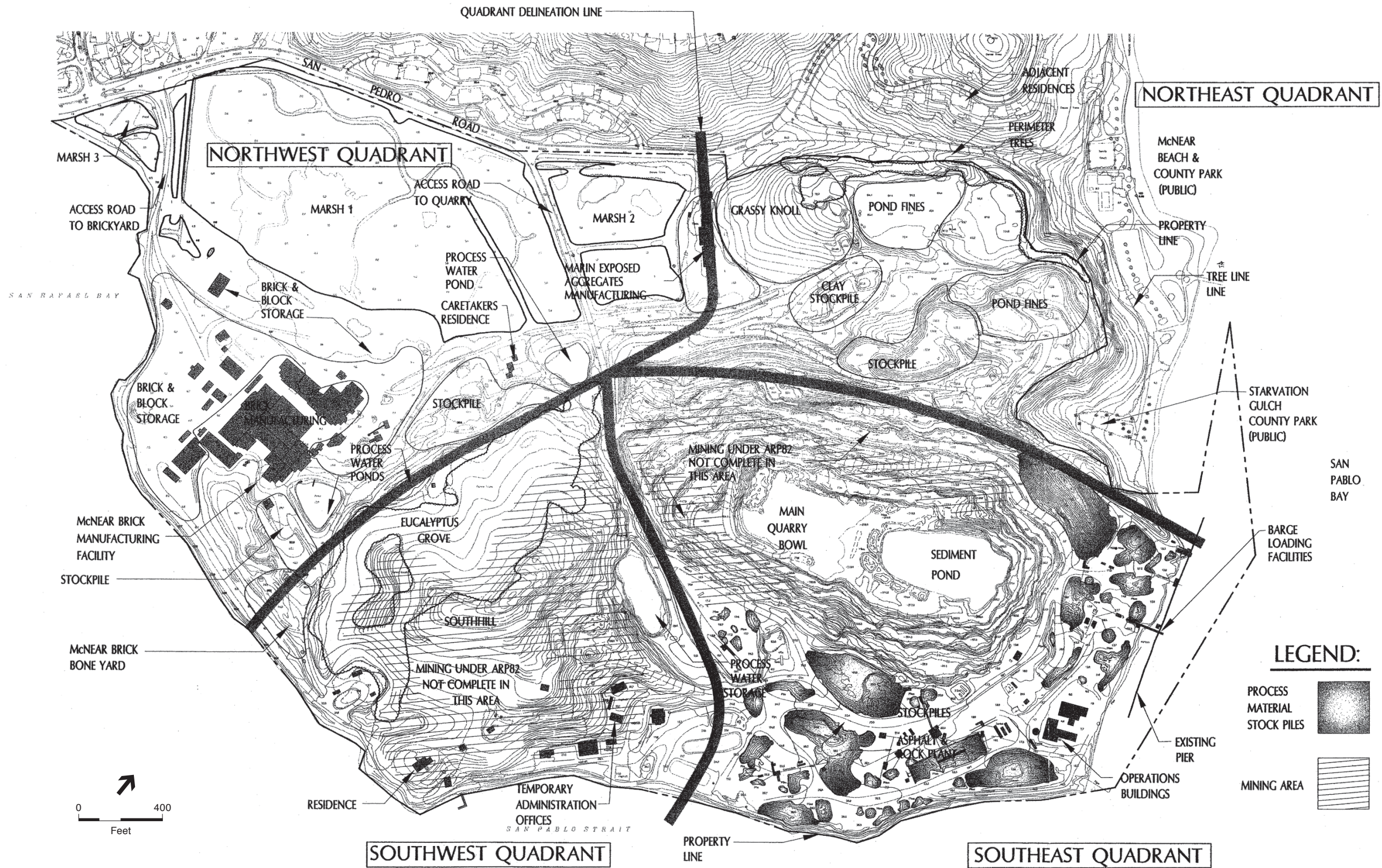
San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 2-1
Project Location

2. SRRQ proposes to excavate the Main Quarry Bowl to an average bottom depth of -350' mean sea level (msl)¹ and a maximum depth of -400' msl, and to extend the Main Quarry Bowl to a greater lateral extent than described in ARP82. Maximum depth under ARP82 was -200' msl. Upon reclamation and flooding of the Main Quarry Bowl, this will result in a larger, deeper harbor. The applicant also proposes to construct the connecting channel to a greater depth than specified in ARP82.
3. SRRQ proposes to mix stockpiled pond fines with overburden in the NE Quadrant to produce material for engineered fills for reclamation purposes.
4. SRRQ proposes to construct a berm approximately 70 feet above existing grade, 300 feet wide by 600 feet long, along the northern property line in the NE Quadrant during Phase 1, to provide a visual and sound screen for the neighbors to the north of the property. The berm will be maintained until the completion of other reclamation activities in the NE Quadrant, and then will be removed.
5. To prepare for future development in the NW Quadrant, SRRQ proposes to construct a surcharge berm, approximately 15 feet above existing grade and covering 5.9 acres, in a portion of the area presently occupied by McNear's Brickyard. The purpose of the surcharge berm is to consolidate the underlying Bay Mud to increase its geotechnical strength to serve as a foundation for future development of the site.
6. SRRQ proposes to construct jetties on either side of the channel that will be constructed to connect the Main Quarry Bowl to the Bay. The purpose of the jetties will be to protect the channel from siltation. Jetties were discussed briefly in ARP82, but ARP04 adds detail to this project element.
7. SRRQ proposes minor alterations to the final contours of the south side of South Hill, compared to final contours depicted in ARP82.
8. SRRQ proposes removal of most of the structures associated with McNear's Brickyard, though some of the structures, such as the brick kiln and its associated stacks, may be retained.
9. SRRQ proposes stockpiling of topsoil in the NW Quadrant.
10. SRRQ proposes to extend the time for completion of quarrying at the site for 15-17 years after approval of the Amended Reclamation Plan. Assuming that the plan would be approved sometime in 2009~~8~~, quarrying would continue until some time around 2024. SRRQ would submit a final Development Plan for post-reclamation use of the site three years prior to the anticipated completion of quarrying.
11. ARP04 establishes several standards for engineered fills and slopes.
12. ARP04 establishes several standards for site revegetation.
13. ARP04 establishes setbacks from sensitive areas and areas to be preserved in a natural state.
14. ARP04 envisions a ferry landing at the location of the present barge loading pier as a post-reclamation site use.

These project elements are described in more detail in Chapter 3, Project Description.

¹ Both ARP82 and ARP04 use a common datum, i.e., NGVD-29.



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 2-2
Existing Conditions

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Amended Surface Mining and Quarrying Permit

SRRQ submitted an application for an Amended Surface Mining and Quarrying Permit (AQP) in 2004. The application describes several changes in conditions and limitations of SRRQ's mining operations that differ from the conditions contained in current permits. These include incorporation of a new Mining Plan, which sets standards for slope angles, benches, and critical elevations of the mined areas; limitations on permissible hours for various operations (see Table 2-1); limits on the number of truck trips accessing the facility, truck routes, and the times at which trucks may arrive and leave the facility; details regarding weather restrictions and emergency operations; limits on blasting, noise, and dust; and protection of visual resources through use of visual screens and shielding of lights. Detailed description of the proposed AQP, including a comparison with conditions of the Quarry's existing permits, is provided in Chapter 3, Project Description.

**TABLE 2-1
PROPOSED HOURS OF OPERATION**

Activity	Monday-Friday	Saturday, Sunday, Holidays	Declared Public Emergencies
Crushing Plant	December 1 – April 30: 7:00 a.m. to 5:00 p.m.; 7:00 a.m. to 10 p.m. on up to 30 calendar days during this period May 1 – November 30: 7:00 a.m. to 10:00 p.m.	None	Restrictions suspended
Maintenance Activities	7:00 a.m. to 5:00 p.m.	Up to 15 Saturdays per year, 7:00 a.m. to 5:00 p.m.	Restrictions suspended
Barge Operation or Loading	7:00 a.m. to 10:00 p.m.	7:00 a.m. to 10:00 p.m.	Restrictions suspended
Truck Access at SRRQ Gate	7:00 a.m. to 5:00 p.m.	No trucks hauling mineral resources	Restrictions suspended
Blasting	11:30 a.m. to 1:30 p.m., with 36 hours advance notification	None	Restrictions suspended
Other mining activities, including drilling, materials handling and transport, etc., other than blasting	7:00 a.m. to 10:00 p.m.	7:00 a.m. to 10:00 p.m.	Restrictions suspended
Office operations	7:00 a.m. to 5:00 p.m.	None	Not specified

SOURCE: SRRQ

Approvals and Entitlements

The primary permit related to the operation of the San Rafael Rock Quarry is the Surface Mining and Quarrying Permit, issued by Marin County pursuant to County Code Chapter 23.06 and SMARA. Preparation of a reclamation plan, and periodic amendment of this plan to ensure its

consistency with current and planned operations, reclamation, and post-reclamation use of the site, is a requirement of both the County code and SMARA.

Under the State of California's Surface Mining and Reclamation Act of 1975 (SMARA), all operators of surface mines in California must prepare and submit for approval by the lead agency a reclamation plan, along with financial assurances that sufficient funds would be available to accomplish reclamation (Public Resources Code [PRC] §2770). The lead agency under SMARA is the jurisdiction with land use authority over the surface mining operation. Substantial deviations from an approved reclamation plan may not be undertaken without the submission to and approval by the lead agency of amendments to the reclamation plan (PRC §2777). Under SMARA, each lead agency must adopt a surface mining ordinance which establishes procedures for the review and approval of reclamation plans and financial assurances, and for issuance of permits to conduct surface mining operations (PRC §2774). Marin County has adopted the required ordinance and it is codified as Title 23, Chapter 23.06 of the Marin County Code.

SMARA (§2733) defines "Reclamation" as the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations, so that mined lands are reclaimed to a usable condition which is readily adaptable for alternate land uses and create no danger to public health or safety. The process may extend to affected lands surrounding mined lands, and may require backfilling, grading, resoiling, revegetation, soil compaction, stabilization, or other measures.

The following activities are considered reclamation:

- Establishment of final reclamation grades;
- Stockpiling of topsoil and other materials for future use in site reclamation, including loading and hauling of material to stockpiles for this purpose;
- Planning and implementation of post-reclamation uses of the Quarry site.

The following activities are considered operations covered by the Surface Mining and Quarrying Permit, and are not considered part of reclamation:

- The activities described and proposed in the project application;
- Removal of topsoil and overburden to expose the mineral resource for quarrying;
- Management of mining wastes and overburden unrelated to reclamation;
- Blasting and extraction of quarry products;
- Importation of Bay sand;
- Crushing, processing, stockpiling prior to shipment offsite, loading, and shipping offsite of quarried materials, including by truck or barge-;
- Operation of an asphaltic concrete batch plant;

- Operation of a truck wash system for washing quarry product transport trucks prior to leaving the facility;
- Maintenance and servicing activities at the Quarry site. “Maintenance activities” include repair, replacement, and failure preventative measures of on-site facilities, fixed plants, spring lines, vehicles, and stationary and mobile equipment related to overall, ongoing quarry activities;
- Wholesale sale of quarry products;
- Operation of the Quarry during state and local emergencies.

Pursuant to SRRQ’s request (which is consistent with established Appellate Court precedent²), CEQA environmental review of SRRQ’s proposed amendments to its Surface Mining and Quarrying Permit (AQP), which governs the Quarry’s ongoing operations, and environmental review of the Amended Reclamation Plan are considered separate projects. For the sake of convenience and clarity, environmental review of the two projects is combined in this ~~Draft~~ Final EIR.

In addition to its ARP and AQP, SRRQ currently operates under the terms of various other permits. These permits, and any revisions to them necessary to maintain consistency with the project, if it is approved, are described in Chapter 3, Project Description.

Alternatives to the Project

State CEQA *Guidelines* §15126.6 requires that an EIR include an evaluation of a range of reasonable alternatives to the proposed project or project location that would feasibly attain most of the project objective but which would avoid or substantially reduce the significant effects of the project. Chapter 6, Alternatives to the Project of this EIR presents several alternatives to the proposed ARP as well as several alternatives to the proposed AQP. This section provides a summary of each alternative. In Chapter 6, the potential environmental impacts and ability to meet basic project objectives are compared with the proposed project.

Alternatives to the Amended Reclamation Plan

In Chapter 6, three feasible alternatives to the proposed ARP are considered. These are:

- No Project/Status Quo Alternative
- Mitigated Alternative
- Alternative Reclamation with Alternative Beneficial End Use

Each alternative is described briefly here; see Chapter 6, Alternatives to the Project for the full description and analysis.

² *El Dorado County Taxpayers for Quality Growth v. County of El Dorado (Cool Cave Quarry, Inc.)*, 122 Cal.App.4th 1591 (2004).

No Project/Status Quo Alternative

The required No Project Alternative must examine the existing conditions and reasonably foreseeable future conditions that would exist if the project were not approved (CEQA *Guidelines* §15126.6(e)). This Alternative assumes no action would be taken for approval of the ARP04 as currently proposed. This would require SRRQ to revert to the provisions of ARP82, which to the extent applicable would remain in effect for reclamation of the site. This would include ARP82's limitations on the depth, lateral extent and duration of mining of the Main Quarry Bowl, and for the final contours of South Hill. It would also delay all reclamation of the site until the cessation of quarrying. Post-reclamation use of the site would differ little from the project as proposed.

Because the extent of quarrying currently exceeds the final grades established for the site under ARP82, SRRQ would remain out of compliance with SMARA in terms of its approved Reclamation Plan. Some additional quarrying of South Hill could be undertaken in a manner that could still allow for compliance with the final contours approved in ARP82. This alternative would result in violation of SMARA and likely trigger one of two future actions: an enforcement action with potential imposition of financial sanctions and referral to Office of Mine Reclamation (OMR) for possible action; and/or the necessity for SRRQ to compose a new amended reclamation plan that would at a minimum require reclamation of the Main Quarry Bowl as currently configured and reclamation of South Hill to achieve the final contours identified in ARP82, based on depletion of the resource at current production levels for mining of this area. Under this enforcement/compliance scenario, SRRQ would be required to begin preparation of detailed plans for cessation of quarrying operations, final site reclamation, and post-reclamation development, at the present time or three years prior to the estimated cessation of quarrying.

Effect on Operations

This alternative would result in the cessation of operations much sooner than anticipated in ARP04.

Mitigated Alternative

The Mitigated Alternative would include all mitigation measures identified in the EIR that pertain to impacts of the proposed ARP, would eliminate or alter those aspects of the proposed ARP that have the greatest likelihood of causing significant impacts, and would include other, beneficial project components not contained in the applicant's proposal. This would include the following:

The NE Quadrant would not be used as a staging area for storage and processing of materials for phased reclamation grading. Instead, areas of the NE Quadrant that are to be left in a natural condition, including the Grassy Knoll and the eucalyptus grove, would in the first phase of reclamation be restored to their final condition. Other areas of the NE Quadrant would be left in their current condition or re-graded to rough final grades, re-soiled, and re-vegetated appropriately to allow for eventual development after cessation of quarrying activities. Stockpiled material would either be left in place or moved to the NW Quadrant for use in constructing the surcharge berm if needed for that purpose. The existing berm in the NE Quadrant would be left in place until the cessation of quarrying.

In the SE Quadrant, SRRQ would continue mining the Main Quarry Bowl until final depth and extent are reached, prior to mining elsewhere on the property, including South Hill. The Main Quarry Bowl would then be used for depositing any excess overburden, pond fines, or other mining wastes from other areas of the property. Materials would be tested to ensure they did not exceed hazardous materials standards prior to placement. ~~In addition, materials from off-site would be brought in, primarily by barge, and deposited in the Main Quarry Bowl to reduce the final depth to approximately 30 feet msl. The most likely material to be used for this purpose is dredge spoils. Dredge spoils could be pumped into the Main Quarry Bowl before it is connected to the Bay, to avoid water quality problems. Any materials placed in the Main Quarry Bowl would eventually be covered with a cap of clean material prior to flooding of the bowl. A mechanical mixing or aeration system would be installed to ensure adequate water quality in the flooded bowl to meet RWQCB water quality standards.~~

In the SW Quadrant, SRRQ would delay further mining of South Hill until mining is completed in the Main Quarry Bowl. Overburden from South Hill would then be temporarily stockpiled or used as backfill in the Main Quarry Bowl.

In the NW Quadrant, the marshes would be restored to their final reclamation condition during phase 1 of reclamation. This would include hydraulic reconnection of the marshes with one another and restoration of tidal circulation. A buffer consistent with current and future use of the NW Quadrant and San Francisco Bay Conservation and Development Commission (BCDC) regulations would be established around the marshes. Stockpiles and the surcharge berm would be configured to avoid damaging or destroying structures eligible for designation as cultural resources. Post-reclamation use of the NW Quadrant would retain and preserve all remaining structures that are eligible for designation as cultural resources and that are suitable for preservation or adaptive reuse.

For this Alternative, post-reclamation uses of the site would be the same as those in the proposed Reclamation Plan. To offset increased energy demand and emission of air pollutants, including greenhouse gasses, post-reclamation development of the site would, however, include measures consistent with the Countywide Plan Update for sustainability and reduced ecological footprint. These features would be incorporated into the proposed future marina, residential, and commercial end use development; including, if found to be feasible at that time, installation and operation of a tidal energy generator facility located in the vicinity of the jetties proposed to be constructed in conjunction with the opening of the Main Quarry Bowl to the Bay.

Effect on Operations

This alternative would affect ongoing quarrying operations, since mining of South Hill would be delayed until after the Main Quarry Bowl is mined; the earlier reclamation of natural areas and limitations on proposed phased reclamation grading activities may also affect the timing and location for management of Quarry's ability to manage mining wastes on the property.

Alternative Reclamation with Alternative Beneficial End Use

The Alternative Reclamation with Alternative Beneficial End Use Alternative would examine significantly different reclamation resulting in substantially different beneficial end uses of the site. These would include action in the near term for protection and restoration of all areas designated as “leave in natural condition” in the applicant’s proposal, and in addition the following:

- The NE Quadrant would be used for open space and recreation, and incorporated into McNear's Beach County Park.
- The NW Quadrant would feature broad buffers around the restored marshes. Approximately 15-20 acres would be developed as a resource interpretive conference center and/or educational facility.
- Under this Alternative, no breach of the Main Quarry Bowl would occur and an alternative beneficial end use would be developed. Instead of a marina with access to the Bay, the Main Quarry Bowl would not be connected to the Bay, and would not be flooded. not be connected to the Bay, and would be filled with fresh water to become a water supply reservoir. This would be developed in conjunction with the Marin Municipal Water District. The area around the reservoir would be used for limited commercial and/or lower density residential development, consistent with protection of water quality within the reservoir. It is possible that non-body contact water recreation would be allowed within the reservoir, with the development of appropriate facilities (e.g., a boat launch). Facilities for a solar array energy generator would be developed as an additional beneficial end use on the southern exposure of the Main Quarry Bowl benches, if deemed feasible at that time. Optionally †The Main Bowl would remain unfilled and used for an alternate land use such as solar energy facilities, an amphitheater, recreational uses including rock climbing, or other suitable future end use. Rainwater can be expected to collect in the bottom of the bowl and form a pond, which might persist year-round. The pond could be used as a recreational or wildlife area.
- Final grades and reclamation grading, re-soiling, and re-vegetation would be consistent with these end uses, including re-soiling of benches and the base of the Main Quarry Bowl to enable the establishment of vegetation consistent with the end use, and maintenance of an access road to the bottom of the bowl. It would be necessary to specify an intended end-use for the Main Quarry Bowl with sufficient time prior to the cessation of mining such that, if necessary, the design of the final slopes of the bowl could be adjusted to ensure an adequate factor of safety for seismic and static stability.

Effect on Operations

Like the Mitigated Alternative, this Alternative may affect ongoing quarrying operations because of earlier reclamation of natural areas; final contours of mined areas may also differ.

Comparison and Conclusion Regarding Alternatives to the Amended Reclamation Plan

As described in Chapter 6, each of the three alternatives would likely result in fewer significant impacts than the project. However, the No Project/Status Quo Alternative would result in impacts not associated with the project, notably interference with the extraction of the mineral resource. The Mitigated Alternative, while reducing would reduce most of the air quality significant impacts of the project, would likely cause another air quality impact associated with diesel emissions from increased barge traffic necessary to backfill the Main Quarry Bowl. without causing new impacts. The Alternative Reclamation with Alternative Beneficial End Use Alternative avoids or reduces most impacts associated with the project as proposed.

In conclusion, the Mitigated Alternative and the Alternative Reclamation with Alternative Beneficial End Use both appear to have the ability to meet most of the project objectives, to reduce significant impacts associated with the project, and to result in additional benefits not realized by the project itself. Therefore, these two alternatives are coequally the Environmentally Superior Alternative.

Alternatives to the Amended Surface Mining and Quarrying Permit

In Chapter 6, four feasible alternatives to the proposed AQP are considered. These are:

- No Project/Status Quo Alternative
- Mitigated Alternative
- Reduced Alternative
- Barge Only Alternative

Each alternative is described briefly here; see Chapter 6 for the full description and analysis.

No Project/Status Quo Alternative

This alternative assumes no action would be taken to amend the existing Surface Mining and Quarrying Permit (SMQP), as currently proposed. The conditions of the existing SMQP would continue in force as long as the Quarry is operating in compliance with its other permits (including a valid, adopted reclamation plan). In addition, the County's understanding of the types of activities occurring on site, as well as the level of production and shipping when the Quarry became a legal non-conforming use in 1982 would continue to apply. These include the following:

- Production levels would be limited to 1982 levels;
- Shipping by truck would be limited to apparent 1982 levels;
- Conditions of approval contained in the SMQP and ARP82 would remain in effect.

Effect of Alternative on Reclamation

This alternative would have no effect on reclamation as planned in ARP04.

Mitigated Alternative

The Mitigated Alternative would include all mitigation measures identified in the EIR, would eliminate or alter those aspects of the proposed AQP that have the greatest likelihood of causing significant impacts, and would include other, environmentally beneficial project components not contained in the applicant's proposal. This would include the following:

- Limiting production to 1982 levels;
- Limiting hours and days of operation;
- Limiting or conditioning noise-generating operations;
- Restricting truck traffic to a maximum of 250 vehicle trips per day;
- Restricting blasting according to recommendations contained in the Revey report (Appendix J) to reduce vibrations and effects on neighbors;
- Limiting dust emissions through implementation of best management practices;
- Accelerated reduction of diesel particulate matter (PM) emissions in advance of federal requirements;
- Development of renewable energy generation projects on the property, such as solar power generation or tidal power generation, to the extent that they are feasible and would not interfere with ongoing quarrying operations;
- Limiting asphalt production to current levels (not levels currently permitted by BAAQMD);

- Inclusion of mitigation efforts currently self-imposed by the applicant, including noise reduction measures.

Effect of Alternative on Reclamation

This alternative may result in decreased production, and so may delay achievement of final reclamation grades: the Quarry may be operated longer under this Alternative.

Reduced Alternative

This alternative incorporates suggestions for project alternatives contained in scoping comments from neighbors of the Quarry. The intent of the alternative is to reduce the intensity of operations and to reduce the incompatibility of quarry operations with other land uses in the area. This alternative includes the following provisions:

- Production levels would be limited to 1982 levels; All mitigation measures associated with the proposed project that are still relevant to the reduced project operations would be applied to this alternative as well;
- ~~Further reduce noise and dust through enclosure of crushing, sorting, and barge loading operations;~~
- ~~Dust emissions would be further reduced by paving all roads used by trucks and heavy equipment that will be in use for more than 3 months;~~
- The Quarry would be required, within 1 year of issuance of an Amended Surface Mining and Quarrying Permit, to prepare a more specific engineering and economic evaluation and report of measures to reduce noise and dust from Quarry operations. This evaluation would include an examination of the increased scope and effectiveness of the dust and noise control measures used for the blasting, crushing, sorting, and barge loading operations. The evaluation would include examination of the economic feasibility, as defined by the Bay Area Air Quality Management District (BAAQMD), of all applicable measures contained in that agency's Best Available Control Technologies (BACT) guidebook, including the following: (1) enclosure of jaw/cone crushers, screens, conveyors and all material transfer points and vent to bag houses with filtration of at least 0.01 gram per dry standard cubic foot; and (2) spraying of storage piles and site road surfaces with water or chemical suppressants. The evaluation would also include an examination of additional measures to reduce dust associated with blasting, including investigation and trial of a pre-blast water spray curtain. Furthermore, the evaluation would examine additional measures to reduce fugitive dust emissions produced by trucks and heavy equipment operating over unpaved surfaces. This would include examination of the option to pave roads, and would also consider air emissions due to paving and removing pavement. The Quarry would be required to implement all feasible measures within one year of report submittal (within two years of issuance of the permit). Determination of increased scope of dust control measures would use the BAAQMD's established cost limits for Best Available Control Technologies. The current standard is \$5,300 per ton of PM-10 reduction.
- ~~Blasting would be limited such that ground motion at the nearest residence is below that recommended in the Revey report. Minimum scaled distance would be $90.8 \text{ ft lb}^{1/2}$; this design would result in a maximum does not exceed a does not exceed a PPV of .125~~ 0.25 inches per second. In addition, the Quarry would be required to give 36-hour advance notice of blast times and predicted intensity, and to ~~The standard for blasting vibrations is~~

~~intended to produce no more than a “barely perceptible” level inside of structures. A binding dispute resolution mechanism would be instituted to resolve allegations by residents of violations of this standard~~ institute a complaint resolution mechanism, with notification to the County Department of Public Works quarterly, of complaints received, and how and when they were resolved between the complainant and Quarry operators;

- Truck trips would be limited to a maximum of 125 one-way trips per day, Monday-Friday, 7 a.m. to 5 p.m., except during times of declared emergencies;
- Quarry operations would be limited to 7 a.m. to 5 p.m., Monday-Friday, except during times of declared emergencies.
- Loaded trucks to be washed down and tarped prior to leaving the Quarry, and to use the right lane only of Point San Pedro Road. This latter provision will be required for SRRQ’s own trucks and contracted trucks, and encouraged for non-SRRQ trucks through a trucker management and education program to be conducted by the applicant. This program will include signs posted at the facility exit scales and metering light stating that loaded trucks must use only the right lane of Point San Pedro Road;
- Conversion of the SRRQ’s truck fleet used for company inter-facility product transfers and deliveries from SRRQ to higher standard engines to reduce emissions, or use of alternative fuel to reduce emissions;
- Use of a state-of-the-art vacuum sweeper on Point San Pedro Road at least two times per day;
- No quarry operations that increase air pollution, including blasting, on declared “Spare the Air Days,” except in times of declared emergencies;

- Following cessation of operations at McNear's Brickyard, the Quarry to would develop a new entry for trucks using the current McNear's Brickyard entry. The number of trucks allowed to use this entry would be approximately equal to the number of trucks now accessing the Brickyard. This would reduce impacts associated with truck traffic at the enable early reclamation of the area now occupied by the existing haul road into the facility.
- Any shipments to Dutra's Haystack Landing facility in Petaluma by barge only.

Effect of Alternative on Reclamation

This alternative may result in decreased production, and so may delay achievement of final reclamation grades: the Quarry may continue to mine for a longer period of time operate longer under this Alternative. Removal or adaptive reuse of enclosed structures would have to be considered under the Amended Reclamation Plan.

Barge Only Alternative

Under this alternative, all products from the quarry would be shipped by barge, and none by truck, except during times of declared emergencies. All other aspects of the operation would be the same as proposed.

Effect of Alternative on Reclamation

This Alternative would not be expected to affect planned reclamation.

Comparison and Conclusion Regarding Alternatives to the Amended Surface Mining and Quarrying Permit

As described Chapter 6, the No Project/Status Quo Alternative would be expected to have more severe environmental impacts than the project as proposed. The Mitigated Alternative would reduce most project impacts, but several would remain significant and unavoidable. The Barge Only Alternative would eliminate impacts related to transport of quarry products by truck, but merely to transfer them to another location; therefore, this Alternative is not considered and so may be considered environmentally preferable to the project as proposed. The Reduced Project Alternative, ~~however,~~ may have the potential to reduce all impacts to less-than-significant, while still meeting or partly meeting all of the applicant's project objectives. Therefore, the Reduced Project Alternative is considered the Environmentally Superior Alternative to the AQP.

Plan and Policy Consistency

An evaluation of the consistency of the proposed ARP and AQP with the Marin Countywide Plan Update and other planning and policy documents (notably the City of San Rafael General Plan 2020) is contained in Section 4.6, Land Use and Planning. The determination of policy consistency discussed in this EIR represents the EIR authors' best judgment (in consultation with County staff) based on strict interpretation of policies. However, policy consistency must ultimately be determined by the Marin County Board of Supervisors and not in this EIR. The

Board of Supervisors may reach a different policy conclusion than the EIR, as a result of its review of the entire record.

The EIR finds that the proposed ARP and AQP projects, with the incorporation of mitigation measures specified in this EIR, are consistent with all relevant policies of the Countywide Plan 2007 and County Development Code requirements. The consistency with the above-cited policies

also appears to be achievable through adoption of the Environmentally Superior Alternatives for both the ARP and AQP.

Summary of Significant Unavoidable, Growth-Inducing, and Significant Irreversible Impacts

This section summarizes the significant unavoidable adverse impacts, growth-inducing impacts, and significant irreversible effects of the proposed project.

Significant Unavoidable Impacts

State CEQA *Guidelines* §15126.2(b) requires that an EIR describe those impacts that cannot be fully mitigated as part of a proposed project action. In some cases, no feasible mitigation measures are available to reduce significance of environmental impacts. In other cases, mitigation measures may be available in connection with the proposed project, but they do not reduce an impact to a less-than-significant level without substantially altering the basic project characteristics. In both of these cases, impacts are considered to be significant and unavoidable.

This EIR finds that the following significant unavoidable impacts would occur if the proposed projects were to be implemented:

Amended Reclamation Plan

Air Quality

~~**Impact R4.2-1:** The proposed Amended Reclamation Plan would result in an increase in daily emissions of criteria air pollutants as a result of reclamation activities being conducted simultaneously with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. This increase in daily emissions would exceed the Bay Area Air Quality Management District established significance thresholds for reactive organic gases, nitrogen oxides, carbon monoxide, and particulate matter equal to or less than 10 microns. Even with implementation of mitigation measures, this impact would still be Significant and Unavoidable for PM-10 and NO_x.~~

~~**Impact R4.2-2:** Phase 4 of the 2004 Amended Reclamation Plan would include cut and fill activities that were not included in 1982 Amended Reclamation Plan. These new reclamation activities would result in emissions of criteria pollutants that would exceed Bay Area Air Quality Management District significance thresholds. Even with implementation of mitigation measures, this impact would still be Significant and Unavoidable for CO, PM-10 and NO_x.~~

Biological Resources

~~**Impact R4.3-7:** Poor water quality in the deep water within the flooded Main Quarry Bowl could occur due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. This condition could result in impacts to special status aquatic species.~~

Hydrology and Water Quality

~~**Impact R4.5-6:** Poor water quality conditions could occur in the deep water within the flooded Main Quarry Bowl due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. Due to the potential infeasibility of available mitigation measures, the impact remains Significant and Unavoidable.~~

Noise and Vibration

Impact R4.7-1: Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations (Beneficial). While construction noise abatement measures would reduce the impact of temporary construction noise it is unlikely that a reduction of construction noise to 58 dBA at the nearest residences would be achieved. Although temporary in nature, berm construction noise impacts would result in an increase of greater than 6 dBA over existing levels and would be considered Significant and Unavoidable, though temporary, even with mitigation.

Cumulative Impacts

Air Quality

Impact C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the Amended Surface Mining and Quarrying Permit (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan, and post-reclamation land uses could cause significant cumulative health effects.

~~**Impact C5-3:** The project would add incrementally to cumulative air pollutant emissions.~~

Land Use and Planning

Impact C4.6-7: Continuing operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit and simultaneous phased reclamation grading under the Amended Reclamation Plan is consistent with land use policies of the Countywide Plan, but would result in continuing significant physical incompatibility impacts with neighboring residential and recreational land uses.

Growth-Inducing Impacts

The CEQA *Guidelines* §15126.2(d) require that an EIR evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined by the CEQA *Guidelines* as:

The way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

As described in Chapter 3, Project Description, SRRQ provides aggregate building materials for Marin County and, especially through barge shipments, for other areas of the Bay and Delta region. The project site is designated a Significant Mineral Resource Area and is one of a dwindling number of quarries in the area supplying essential aggregate material for a variety of construction uses, including road building and paving, concrete, and riprap for shoreline and levee revetment. Project approval would enable SRRQ to continue to produce aggregate through approximately 2024, when the final reclamation grades would be reached. Thereafter, reclamation of the site would be completed and the land would be developed consistent with current City of San Rafael and County of Marin land use designations.

Two aspects of growth inducement may be inferred from the projects. The first is that the continued supply of aggregate from the Quarry will contribute to the ability to undertake construction projects throughout the region. This may be seen as removal of a barrier to development; however, it may more accurately be regarded as enabling development for which pressures are exerted from other quarters: the availability of aggregate does not so much induce growth as to enable growth, as well as the continued functioning of our civilization, which is literally built on rock.

The second potential growth inducing effect of the projects is with regards to development of the site itself following cessation of mining and completion of planned reclamation. The development of the site as envisioned in ARP04 is essentially identical to the planned post-reclamation use of the site that has been in place since 1976, and which is explicitly described in the current amended reclamation plan (ARP82). Since the area around the project site is already built-out or protected as open space, development of the quarry site would not be expected to trigger new development in the vicinity. Furthermore, through the review of the final Development Plan, due to be submitted three years prior to the expected cessation of mining, Marin County and the City of San Rafael can be expected to guide site development such that it is consistent with then-existing and planned infrastructural capacity (including the capacity of Point San Pedro Road). Therefore, post-reclamation development of the site is not expected to induce additional growth.

Significant Irreversible Environmental Changes

None of the impacts of the project is expected to result in significant irreversible environmental changes; the irreversible changes to the landscape, including changes due to mining of South Hill and the Main Quarry Bowl, as well as the planned flooding of the Main Quarry Bowl and its connection to San Francisco Bay, were already contemplated in the existing permits, and so are not considered changes due to the projects currently under consideration.

Areas of Controversy

The proposed project raises issues and areas of controversy that will be considered by County and other decision-makers. Controversial issues are known through expressions of public opinion that are documented in the record or obtained through public meetings, and through comments on the project provided by staff of various interested governmental agencies. Prior to circulating the

Draft EIR (DEIR), the County circulated Notices of Preparation (Appendix F) to agencies and interested parties and conducted public scoping sessions in the community. Comments on the Notices of Preparation and those received during the scoping sessions are provided in Appendix G. Additional issues were raised in comment on the Draft EIR and have been addressed in the responses to these comments (see Chapter 7, Comments and Responses, in Volume II).

Some areas of controversy are not within the purview of CEQA, because that statute focuses on evaluation of significant effects to the physical environment. The non-environmental issues are included below, however, to help provide information to County and other decision-makers. Those areas of controversy that relate to a physical impact issue within CEQA's purview, are so noted in the list below.

The areas of controversy expressed in the environmental review process to date are as follows:

1. Many residents of the Peacock Gap neighborhood and the Marin Bay Park development have expressed concerns about the effects of ongoing mining operations and planned reclamation grading. These include concerns regarding damage to property and/or disturbance due to blasting vibration, dust, noise from operations and haul trucks, truck traffic on Point San Pedro Road, and emissions from diesel equipment. These issues are addressed in the relevant EIR sections, with respect to the potential for mining and reclamation activities to exceed established thresholds of significance, and within the context of existing permitted operations and planned reclamation. These issues are further described in comments on the Draft EIR and in the responses to comments in Chapter 7 of this Final EIR.
2. Many residents of the Peacock Gap Neighborhood and the Marin Bay Park development have expressed concerns regarding the potential adverse effects on human health of exposure to diesel particulate matter contained in emissions from trucks and equipment associated with mining and reclamation activities, and also exposure to fine particles of crystalline silica thought to be present in dust emitted from the Quarry. This EIR includes the results of a Human Health Risk Assessment (HRA) conducted to address these concerns (see Section 4.2, Air Quality). Numerous comments on the Draft EIR address the HRA, including comments from HRA experts (contained in comment letters 19 and 30). Responses to these comments confirm the findings described in the Draft EIR.
3. Scoping comments on the AQP include suggestions to use expansive media or other substitutes for blasting. A report prepared for this EIR by an internationally renowned blasting expert and mining engineer finds that alternatives to blasting at SRRQ are infeasible or would create other adverse effects that would be greater than blasting (Appendix J).
4. San Rafael Rock Quarry provides aggregate that is a basic and necessary component of essential construction materials, including asphaltic concrete, concrete, and rip-rap. Because SRRQ has a deep water barge dock, it is able to supply rip-rap material for revetment of levees in the Sacramento-San Joaquin River Delta; in recent years SRRQ has had contracts to supply rock for this purpose under a State of Emergency declared by the Governor. There are few active hard rock quarries in the Bay Area, and fewer that have ready access to a deep water dock. Increasingly, aggregate materials are being shipped into the area, from as far away as British Columbia, Canada. Adverse consequences of importation of aggregate materials include increased cost, increased air emissions (including greenhouse gas emissions) risk of upset associated with shipping long distances, and exportation of environmental effects to remote locations unseen by the people who will benefit from the use of the material in roads, buildings, and levees.

5. The Draft EIR had concluded that there would be significant unavoidable impacts to water quality and biological resources associated with the plan to flood the Main Quarry Bowl as part of reclamation. The applicant provided new information, that was corroborated by research undertaken by County staff and the EIR preparers, that demonstrates the feasibility of mitigation measures to reduce or avoid these impacts. The conclusions regarding these impacts have therefore been changed, this Final EIR states that they can be mitigated to less than significant. See Master Response 7 in Section 7.2, Master Responses, in Volume II.

Major Conclusions and Issues to be Resolved

The following major conclusions and issues to be resolved are derived from the analysis in the EIR. The major conclusions of the EIR are presented first, followed by the issues to be resolved. The issues are presented to highlight the topics on which the decision-makers may want to focus special attention.

Major EIR Conclusions

1. With regards to the ARP, the EIR evaluates a total of 61 project-based adverse environmental impacts. Of these, 34 are identified as significant impacts. Feasible mitigation measures are available to reduce all but 5 1 of the ARP's significant project-based effects to a less-than significant level. For the AQP, the EIR evaluates a total of 16 project-based adverse environmental impacts. Of these, 11 are identified as significant impacts. Feasible mitigation measures are available to reduce all of the AQP's significant project-based effects to a less-than significant level. The EIR also evaluates cumulative impacts of the two projects combined, and of the AQP and ARP in combination with other related past, present, and foreseeable future projects. The EIR identifies 15 cumulative impacts, 5 of which are significant, and 3 2 which would remain significant even with incorporation of feasible mitigation measures.
2. The ARP and AQP would ~~have significant, unavoidable impacts on air quality, including a contribution to~~ contribute to a significant, unavoidable cumulative human health risks (Section 4.2, Air Quality). These effects could be reduced, but not rendered less than significant through specified mitigation measures, adoption of the Mitigated Alternative or the Alternative Reclamation with Alternative Beneficial End Use Alternative (the co-equal Environmentally Superior Alternatives), both of which would delay most reclamation grading activities until after the cessation of mining (Chapter 6, Alternatives).
3. ~~The ARP would have a significant unavoidable reclamation impact on water quality associated with flooding the Main Quarry Bowl by connecting it with San Francisco Bay.~~
43. Past quarry operations, including shipping materials by truck on Point San Pedro Road, have caused an increase in the incremental risk of cancer for exposed individuals in the vicinity of the quarry and haul route (Section 4.2, Air Quality). The majority of this risk is related to past adverse conditions resulting from past operations (since diesel engine technology and fuel formulation have resulted in decreases in diesel particulate emissions), but future operations would continue to contribute to it. Although direct impacts of the projects themselves are mitigated to less than significant, the combined effects of past adverse conditions and continued operations are still cumulatively considerable pursuant to CEQA.
54. Construction of a berm in the NE Quadrant to serve as a visual screen and noise buffer from reclamation grading activities for residents to the North would ultimately reduce the adverse effects of reclamation grading in this part of the project site, but the construction of the berm would result in a significant, unavoidable – albeit short-term – noise impact.
65. The AQP would be consistent with all plan policies of 2007 Countywide Plan Update, but would still result in continued physical impacts contributing to cumulatively considerable incompatibility of land uses between SRRQ and the neighboring residential areas. This

cumulative impact can be reduced, but not resolved, given the desired level of operations of SRRQ, as expressed in their application for the AQP. The Mitigated Alternative would reduce this incompatibility, but it would still exist. The Reduced Alternative has the potential to resolve this cumulative impact to a greater extent by substantially limiting mining operations, but a residual significant unavoidable cumulative impact would likely remain. Reclamation activities under the proposed ARP would also contribute to this cumulative impact.

76. Both the ARP and the AQP have the potential for significant adverse effects on biological resources on the project site and in the vicinity. Section 4.3, Biological Resources, identifies numerous, detailed mitigation measures to reduce these impacts to ~~the extent feasible~~ less than significant levels.

Issues to be Resolved

1. In the Draft EIR, Section 4.5, Hydrology and Water Quality, identified a significant unavoidable reclamation impact on water quality associated with flooding the Main Quarry Bowl by connecting it with San Francisco Bay. This would be due to limited mixing of water in the depths of the flooded bowl, and the likelihood that the water column would stratify and water quality decline. This impact may be avoided by the ARP mitigated alternative that includes filling the quarry bowl with dredge spoils and other soils to a level that would avoid water quality impacts or by the Reduced Alternative which provides that the Main Quarry Bowl would not be connected to the Bay, and would be filled with fresh water (at a lower level) to become a water supply reservoir or would remain unfilled and used for an alternate land use such as solar energy facilities, amphitheater or other suitable future end use. New information received from the applicant (see comment letter 19) and confirmed through research conducted by County staff and the EIR preparers demonstrates the feasibility of a mechanical mixing or aeration system to avoid stratification of the water column. In this Final EIR, this impact is considered to be reduced to less-than-significant with incorporation of this mitigation measure. Mitigation Measure R4.5-6 requires the applicant, within one year of approval of the Amended Reclamation Plan, to submit a concept engineering and economic report for use and maintenance of a mechanical mixing or aeration system, or another engineered approach, that will result in avoidance or elimination of a stratified water column within the Main Quarry Bowl after it is flooded.
2. Post-reclamation development of the project site, as envisioned in the ARP04, has changed little since the adoption of ARP82. However, Point San Pedro Road may not be able to accommodate planned development. The 2007 Countywide Plan Update and San Rafael General Plan 2020 call for a traffic study prior to post-reclamation development to determine road capacity and level of traffic generated by proposed development density that can be accommodated in post-reclamation development design. Public agency review of the final Development Plan, which is to be submitted three years prior to the cessation of mining, will have to resolve the issue of the intensity and type of development that may be allowed on the site.
3. ARP04 envisions removal of most or all of the structures at McNear's Brickyard. The EIR finds that several of these structures may be eligible for listing as historic resources in the National and California Registers (Section 4.12, Cultural Resources). Mitigation measures contained in this EIR would require standards to be included in the reclamation plan to guide the future development design to ensure that eligible structures are preserved or

adapted for re-use consistent with guidelines meant to retain the integrity of their historic significance. The actual plans for permanent preservation and adaptive re-use should be reviewed as part of the final Development Plan, which will be submitted three years prior to the cessation of mining.

4. The Board of Supervisors will need to consider whether to approve the projects with adoption of findings of overriding consideration for the projects with significant unavoidable impacts as identified in this EIR and/or recommend changes to the AQP and ARP to implement features of one or more of the Environmentally Superior Alternatives evaluated in the EIR.

Effects Found Not to Be Significant

Table 2-2, at the end of this chapter, includes summary discussions of several impacts that were found not to be significant, and which therefore do not require mitigation.

The Initial Study prepared for the AQP prior to commencement of work on the EIR found that SRRQ's AQP proposal would not have the potential to result in any new or more severe significant impacts within several topical impact areas. These include the following:

- Population and Housing
- Geophysical
- Water
- Transportation/Circulation
- Energy and Natural Resources
- Public Services
- Utilities and Service Systems
- Social and Economic Effects

Effects of the AQP on these resources are not considered further in this EIR.

The EIR itself finds that there would be no significant effects of the ARP in the following topical impact areas:

- Public Services, Utilities, and Energy
- Transportation and Traffic
- Population and Housing

Other Social and Economic Impacts Found Not to Be Significant

As discussed previously, State CEQA *Guidelines* §15382 provides that “[a]n economic or social change by itself shall not be considered a significant effect on the environment.” However, physical impacts associated with social or economic changes may be considered significant. Pursuant to State CEQA *Guidelines* §15382, purely economic or social impacts would not be considered significant impacts of the proposed project, and are not, therefore, addressed in this EIR. This EIR evaluates all physical impacts that would result from the proposed project and has not identified any physical impacts associated with social or economic changes.

**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<i>Aesthetics</i>		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.1-1: Visual impacts on the view from Vantage Point 3, the public walkway and public road southwest of the site (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.1-1a: Implementation of Mitigation Measure R4.12-6a, retention of Hoffman Kiln #1 and its stack, would partly mitigate this impact.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.1-1b: Implementation of Mitigation Measures Mitigation Measure R4.12-5a, R4.12-6b, and R4.12-6c in conjunction with Mitigation Measure R4.12-7a, to ensure that key historic structures are preserved, would also mitigate the adverse visual impacts that would result from the loss of these structures.</p>	Less than Significant
R4.1-2: Visual impacts on the view from Vantage Point 5, Via Montebello near San Marino Drive in the Peacock Gap Neighborhood (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>See Mitigation Measure R4.1-1a.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>See Mitigation Measure R4.1-1b.</p>	Less than Significant
R4.1-3: Visual impacts on the view from Vantage Point 6, a Marin Bay Park Court residence north of the site (Less than Significant).	None required.	
R4.1-4: Visual impacts on the view from Vantage Point 8, China Camp State Park (Less than Significant).	None required.	
R4.1-5: Visual impacts on the view from Vantage Point 11, the public ferry, San Pablo Bay (Beneficial).	None required.	
R4.1-6: Visual impacts from McNear's Beach County Park (Less than Significant).	None required.	
R4.1-7: Adverse impacts due to light and glare (Less than Significant).	None required.	
R4.1-8: Visual impacts at completion of the proposed ARP (Less than Significant).	None required.	

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C = Impacts prefaced by a "C" would result from the cumulative impact of the two projects

TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<i>Impacts of the Amended Surface Mining and Quarrying Permit</i>		
P4.1-9: Proposed nighttime operations would introduce new sources of light and glare (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.1-9: The AQP will restrict operations that have the potential to cause nighttime sources of light and glare and that are visible from public vantage points (including the Bay and vantage points across the Bay), roadways, and residences to daytime hours, except during emergency operations. See Mitigation Measure 4.6-6b in Section 4.6, Land Use and Planning.</p>	Less than Significant
P4.1-10: Visual impacts from McNear's Beach County Park (Less than Significant).	None required.	
<i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i>		
C4.1-11: Impacts on visual resources of ongoing quarrying operations, in conjunction with impacts of phased reclamation grading activities, could cause a cumulative impact (Less than Significant).	None required.	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
Air Quality		
<i>Impacts of the Amended Reclamation Plan</i>		
<p>R4.2-1: The proposed Amended Reclamation Plan would result in an increase in daily emissions of criteria air pollutants as a result of reclamation activities being conducted simultaneously with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. This increase in daily emissions would exceed the Bay Area Air Quality Management District-established significance thresholds for reactive organic gases, nitrogen oxides, carbon monoxide, and particulate matter equal to or less than 10 microns (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.2-1a: The project applicant has recently initiated the use of biodiesel fuel in all quarry rolling stock. Biodiesel is the only alternative fuel for which a detailed emissions evaluation has been submitted to the United States Environmental Protection Agency (USEPA). The effectiveness of emission reduction resulting from the use of biodiesel is dependant upon the percent of biodiesel contained in the mixture (USEPA, 2002). The most common blend, and that currently used at SRRQ, is a 20 percent biodiesel and 80 percent conventional diesel (B-20). B-20 will reduce particulate and CO emission by approximately 12 percent, and reduce hydrocarbon emissions by approximately 20 percent. Use of biodiesel may increase or decrease NOx emissions (McCormick et al, 2006).</p> <p>R4.2-1b: SRRQ has already upgraded SRRQ's entire fleet of off-road diesel equipment to USEPA Tier 3 standards, ahead of regulatory requirements that at least 10 percent of the fleet be upgraded each year. SRRQ also plans to upgrade its tug boat fleet to Tier 2 standards prior to the end of 2008.</p> <p>R4.2-1c: SRRQ already implements several measures to control dust. These will be continued under the project:</p> <ul style="list-style-type: none"> • All trucks leaving the Quarry shall be washed down, including the undercarriage, prior to entering Point San Pedro Road (except trucks transporting asphalt). The wash down and adjoining areas shall be paved to minimize tracking of dust and dirt. Point San Pedro Road will be swept up to two times per day, except on rain days, when no sweeping will occur, subject to the approval of the City of San Rafael; • The Quarry shall maintain all required erosion control measures and stormwater management plans, and shall keep current and comply with all permits required by the Regional Water Quality Control Board; 	<p style="text-align: center;"><u>Less than Significant</u> Significant and Unavoidable for PM-10 and NOx</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • The Quarry shall maintain all dust abatement devices, and shall keep current and comply with all permits required by the BAAQMD. <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.2-1d: The project sponsor shall be required to continue existing emission reduction practices, including use of alternative fuels, use of low-emission diesel equipment, and dust abatement measures.</p> <p>R4.2-1e: The applicant shall implement additional dust abatement measures identified by BAAQMD as feasible dust control, during all reclamation grading activities:</p> <ul style="list-style-type: none"> • Cover all trucks hauling soil, sand, and other loose materials as a part of reclamation activities, or require such trucks to maintain at least two feet of freeboard between the top of the material and top of truck; • Pave, apply water at a minimum three times daily in dry weather, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at the Quarry; • Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the Quarry; • Hydroseed, apply non-toxic soil stabilizers, or water to inactive reclamation areas (previously graded areas inactive for ten days or more); • Limit traffic speeds on unpaved roads to 15 miles per hour; • Install sandbags or other erosion control measures to prevent silt runoff to public roadways; • Replant vegetation in disturbed areas as soon as the growing seasons dictates; • Install wind breaks or plant trees/vegetative wind breaks at the windward sides of the reclamation areas until such time as the vegetation is established; 	

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • Suspend reclamation-related excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour; and • Limit the area subject to reclamation-related excavation, grading and other construction activity at any one time. <p>R4.2-1f: The project applicant shall keep all off-road equipment well-tuned and regularly serviced to minimize exhaust emissions, and shall establish a regular and frequent check-up and service/maintenance program for all operating equipment at the Quarry.</p> <p>R4.2-1g: To further reduce emissions from off-road diesel equipment, the applicant shall fuel on-site diesel-powered mobile equipment used in reclamation activities with a minimum 80 percent biodiesel blend (B-80) or use other equipment and/or fuel that achieves the same reduction in particulate (PM-10) and CO emissions.</p> <p>R4.2-1h: Off-road diesel equipment operators shall be required to shut down their engines rather than idle for more than 5 minutes, unless such idling is necessary for proper operation of the vehicle.</p> <p>R4.2-1i: <u>The applicant will acquire BAAQMD off-site emission offset credits in sufficient quantity to reduce emissions from reclamation grading to levels below significance thresholds.</u></p> <p>Mitigation Measure R4.2-1j: <u>The applicant will limit on-site mining operations on days on which reclamation grading activities are performed, such that total emissions from the site are not increased above significance thresholds. To ensure the effectiveness of this measure, the Quarry will be required to maintain and report to the BAAQMD and the County Public Works Department a record of reclamation and operations activities, with an estimate of emissions from each. Since emissions related to reclamation grading were not quantified in ARP82, and since simultaneous reclamation and mining was not contemplated in ARP82, the baseline for combined emissions is the current level of emissions for mining operations only, as shown in Table 4.2-5. The limit for combined emissions from mining and reclamation will</u></p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.2-2: Phase 4 of the 2004 Amended Reclamation Plan would include cut and fill activities that were not included in 1982 Amended Reclamation Plan. These new reclamation activities would result in emissions of criteria pollutants that would exceed Bay Area Air Quality Management District significance thresholds (Significant).</p>	<p><u>therefore be the current emissions levels from mining operations plus the BAAQMD's threshold values for criteria pollutants, as shown in Table 4.2-10.1.</u></p> <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.2-2a: Mitigation measures R4.2-1a, b, and c apply to Phase 4 as well.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.2-2b: Implement Mitigation Measures R4.2-1d through R4.2-1jh for Phase 4.</p>	<p><u>Less than Significant</u> Significant and Unavoidable for CO, PM-10, and NOx</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.2-3: Reclamation activities will generate greenhouse gas emissions that will contribute to climate change (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.2-3a: The applicant already uses a 20 percent biodiesel blend (B-20) in on-site mobile equipment; see Mitigation Measure R4.2-1a. The CO₂ produced by burning biodiesel is considered "biogenic," that is, it is part of the natural cycling of carbon in the atmosphere and biosphere. Because it is not from a fossil source, it is not included in GHG inventories. Therefore, the use of B-20 reduces CO₂ emissions that contribute to global climate change from on-site mobile equipment by approximately 20 percent.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.2-3b: Implementation of Mitigation Measure R4.2-1d, f, g, and h through R4.2-3a will reduce running time of diesel equipment, replace diesel equipment with less polluting equipment, and increase the use of biodiesel in on-site equipment. The amount of reduction in GHG emissions is estimated to be approximately an additional 65 percent.</p> <p>R4.2-3c: Within one year of project approval, the applicant shall prepare and implement a GHG reduction plan. The plan will include a complete inventory of reclamation-related GHG emissions and will demonstrate how the Quarry will reduce or offset remaining un-mitigated GHG emissions. <u>The plan will prioritize emission reduction through energy conservation and other measures; for those emissions that cannot be reduced, the plan shall specify how emissions will be offset.</u> Offsets may take the form of installation of on-site alternative energy generation facilities (such as solar power) or off-site compensation, such as monetary contribution to a project that sequesters carbon. Examples of such projects include wetland restoration, purchase of carbon credits verified by the California Climate Action Registry, and reforestation. <u>On-site offsets will be given higher priority than off-site offsets, and offsets with co-benefits, such as reduction of particulate emissions within the vicinity of the Quarry, and restoration of habitat for special status species, will be given higher priority.</u> The plan must demonstrate how, at a minimum, the Quarry will reduce reclamation-related, non-biogenic GHG emissions consistent with the Marin County Greenhouse Gas Reduction Plan and Countywide Plan Update policies: <u>since no</u></p>	<p>Less than Significant</p>

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.2-4: The proposed Amended Reclamation Plan would result in post-reclamation development similar to that proposed in the 1982 Amended Reclamation Plan. These future land uses will result in emissions of criteria air pollutants (Less than Significant).</p>	<p><u>reclamation-related emissions were occurring in 1990, the plan must demonstrate how reclamation-related emissions are reduced or offset, such that there are no net emissions from reclamation. The plan will include an implementation schedule. The plan will be submitted to the Marin County Community Development Agency Public Works Department for review and approval. In addition, the initial emissions inventory prepared as part of the plan will be reported to the California Climate Action Registry or a successor organization as a baseline inventory, and the Quarry will conduct and report additional inventories annually.</u></p> <p>None required.</p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
R4.2-5: The proposed Amended Reclamation Plan would result in post-reclamation development and land uses that will emit greenhouse gasses, and contribute to global climate change (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.2-5: The applicant shall revise the ARP to include a standard to guide the future design of the final Development Plan (due to be submitted to the County three years prior to the cessation of mining) to incorporate a detailed inventory of GHG emissions associated with the planned post-reclamation development, and a plan to reduce GHG emissions consistent with Countywide Plan policies and other relevant County, state and federal standards, as applicable.</p>	Less than Significant
<i>Impacts of the Amended Surface Mining and Quarrying Permit</i>		
P4.2-6: Future Quarry operations under the proposed Amended Surface Mining and Quarrying Permit could exceed baseline levels of production, with concomitant increases in emissions of criteria air pollutants above threshold values (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>P4.2-6a: Mitigation measures R4.2-1a, R4.2-1b, and R4.2-1c apply to equipment used in ongoing quarrying operations as well.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.2-6b: Implement Mitigation Measures R4.2-1d through R4.2-1h for ongoing quarrying operations as well as reclamation activities.</p> <p>P4.2-6c: Implement Mitigation Measure P4.6-6b (see Section 4.6, Land Use and Planning), which would limit Quarry operations to the maximum level of annual production as of 1982.</p>	Less than Significant
P4.2-7: Proposed amendments to the Surface Mining and Quarrying Permit could result in an increase in greenhouse gas emissions, and contribute to global climate change (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>P4.2-7a: The applicant proposes to limit truck trips into and out of the Quarry to 250 trips per day, which is below the baseline level of truck trips. Therefore, GHG emissions from haul trucks would not increase above 1990 levels.</p> <p>P4.2-7b: The applicant already uses a 20 percent biodiesel blend in on-site mobile equipment; see Mitigation Measure R4.2-1a. Biodiesel reduces CO2 emissions that contribute to global warming, since biodiesel is derived from plant and animal sources, not fossil sources.</p>	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<i>Mitigation Measures Identified in this Report</i>	
	P4.2-7c: Mitigation Measure P4.2-6b will further reduce GHG emissions below 1990 levels from on-site mobile equipment used for Quarry operations.	
	P4.2-7d: Mitigation Measure P4.6-6b will limit production to baseline (1982) levels, which will ensure no increase in emissions from on-site mobile diesel equipment and tugboats.	
	P4.2-7e: The Greenhouse Gas Reduction Plan specified in Mitigation Measure R4.2-3c2b shall also include an inventory of operations-related GHG emissions and a plan to reduce these emissions to a level 15 percent below 1990 levels. <u>The plan will include an inventory of 1990 and current GHG emissions related to Quarry operations; the values in Table 4.2-14 may be considered preliminary, and should be confirmed or revised in a new inventory.</u>	
<i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i>		
C4.2-8: Cumulative air quality impacts could result from quarrying activities implemented under the Amended Surface Mining and Quarrying Permit occurring simultaneously with proposed phased reclamation grading activities (Less than Significant).	None required.	
<i>Health Risk Assessment</i>		
C4.2-9: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including diesel particulate matter, increasing the risk of cancer for nearby sensitive receptors (Significant).	<i>Mitigation Measures Proposed as Part of the Project</i>	Less than Significant
	C4.2-9a: As noted in Mitigation Measures R4.2-1 and P4.2-6, the applicant has taken measures to reduce DPM emissions from on-site equipment, including upgrading to lower emission engines and use of B-20 fuel.	
	<i>Mitigation Measures Identified in this Report</i>	
	C4.2-9b: Implement Mitigation Measure P4.6-6b, which would limit proposed project aggregate production levels to 1982.	
	C4.2-9c: Implement Mitigation Measure R4.2-1 and Mitigation Measure P4.2-6 to further reduce DPM emissions from on-site mobile equipment used both for reclamation and for mining operations.	

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
C4.2-10: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including crystalline silica, that would increase chronic health impacts (Less than Significant).	None required.	
C4.2-11: Toxic Air Contaminant emissions could cause an acute health impact for nearby receptors (Less than Significant).	None required.	
C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the Amended Surface Mining and Quarrying Permit (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan, and post-reclamation land uses could cause significant cumulative health effects (Significant).	No additional mitigation is available to further reduce the cancer health risks from the current projects or from reasonably foreseeable future projects, beyond those stated in Mitigation Measures C4.2-9a, b, and c.	Significant and Unavoidable
Biological Resources		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.3-1: Reclamation activities during Phases 1 through 4 will result in the loss of upland ruderal and barren habitat (Less than Significant).	None required.	
R4.3-2: Reclamation activities during Phases 1 through 4, as well as post-reclamation uses of the site will result in the loss of native vegetation at San Rafael Rock Quarry, including mixed perennial grassland, coastal scrub, and coast live oak woodlands (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-2a: ARP04 contains "Standards for Preserving Sensitive Habitat Areas." Implementation of these standards will protect specific areas of oak woodland and native grassland.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-2b: The applicant shall submit to the Marin County Department of Public Works a revised ARP that includes the preservation of the small hill, consistent with ARP82. Any plans for future alteration of the small hill for post-reclamation development may be proposed as part of the final Development Plan, due to be submitted three years prior to the cessation of mining.</p>	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-3: Reclamation activities implemented in Phases 1 through 4 could result in temporary disturbance to or mortality of Point Reyes bird's beak and Gairdner's yampah (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-3a: ARP04 delineates areas to be preserved, including portions of South Hill, the Grassy Knoll, and the marsh areas.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-3b: Prior to each reclamation phase and during the planning for post-reclamation development presence/absence surveys for special-status plants will be conducted by a qualified botanist within areas to be disturbed.</p> <ul style="list-style-type: none"> • Surveys will be conducted in accordance with CNPS and CDFG rare plant survey guidelines. • Surveys will be conducted prior to the start of each phase of reclamation activities, during the flowering period when the species is most readily identifiable (June – October). • The results of the surveys will be filed with the County; if the presence of any of these species is confirmed, a copy of the survey results will be forwarded to CDFG, and Mitigation Measure R4.3-3c will be implemented. • In the event that special-status plants are proven absent, then no additional mitigation is necessary. <p>R4.3-3c: In the event that special-status plant populations are found during the surveys conducted pursuant to Mitigation Measure R4.3-3b, the project proponent will avoid disturbance to the species by establishing a visible buffer zone of not less than 25 feet prior to construction or by relocating reclamation activities if feasible to avoid disturbance. Where necessary reclamation activities cannot be altered to avoid disturbance, the applicant shall relocate affected special-plant populations and/or restore similar habitat in another location:</p> <ul style="list-style-type: none"> • Protection of special status species will be coordinated by a qualified biologist. 	<p>Less than Significant</p>

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-4: Reclamation activities implemented in Phases 1 through 4, as well as post-reclamation development could result in damage to or removal of protected trees that are within or adjacent to areas to be reclaimed or developed (Significant).</p>	<ul style="list-style-type: none"> • Disturbance or mortality of special status plant habitat and species shall be avoided as a priority. If a qualified biologist determines that restoration would provide equivalent or more effective mitigation, special-status plant habitat and/or sensitive plant communities may instead be restored on-site at a 2:1 ratio in areas that are to remain as post-reclamation open space, such as the Grassy Knoll or within the salt marshes. • Special-status plants and/or seeds will be salvaged from areas of disturbance and moved to restoration areas on or off the site; if this is not feasible, an alternate source of seed or plant material will be selected by a qualified biologist. • A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards will include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species (<u>any species listed on the California Invasive Plant Council's California Invasive Plant Inventory</u>); and a functioning, self-sustaining plant community at the end of five years. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-4a: ARP04 delineates areas to be preserved, including portions of South Hill and the Grassy Knoll.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-4b: Implement Mitigation Measure 4.3-2b to protect the trees located on the small hill in the NW Quadrant.</p> <p>R4.3-4c: The applicant will implement the following measures in order to minimize damage to protected trees that are to be preserved on-site:</p> <ul style="list-style-type: none"> • Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, preserved trees that occur adjacent to project construction areas shall be identified as preserved and clearly delineated by constructing short post and plank walls, or other protective fencing material, at the dripline of each tree. 	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • The delineation markers shall remain in place for the duration of the work. • Where reclamation activities would encroach upon the dripline of a preserved tree, special construction techniques will be required to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, use of hand equipment for tunnels and trenching, and/or allowance of only one pass through a tree's dripline). Tree wells or other techniques may be used. • The following shall not occur within the dripline of any retained tree: parking; storage of vehicles, equipment, machinery, stockpiles of excavated soils, or construction materials; or dumping of oils or chemicals. • If a tree within a preserved area is damaged or destroyed, the applicant shall replace the tree at a ratio of 2:1 with trees of the same species. Tree replacement shall be performed by a certified arborist. <p>R4.3-4d: All pruning activities of preserved trees shall be performed by a certified arborist. No more than 25 percent of a tree's canopy shall be removed during pruning activities of retained trees.</p> <p>R4.3-4e: The project proponent shall develop and implement a five-year monitoring program for any required replacement plantings, as specified in Mitigation Measure R4.3-4c. The performance standards for tree replacement include all of the following: 75 percent survival rate of restoration plantings; absence of invasive plant species (<u>any species listed on the California Invasive Plant Council's California Invasive Plant Inventory</u>); and self-sustaining trees at the end of five years. If these criteria are not met, the applicant shall re-plant and success shall again be assessed after five years.</p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-5: Reclamation activities as well as post-reclamation development could result in substantial adverse effects on wetlands and waters of the U.S. under the jurisdiction of the Army Corps of Engineers, waters of the State under the jurisdiction of California Department of Fish and Game or the Regional Water Quality Control Board, and waters and land under Bay Conservation and Development Commission and State Lands Commission jurisdiction, and would be inconsistent with standards established for the Baylands Corridor in the Countywide Plan update (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-5a: ARP04 contains standards for setbacks from marsh areas. As stated in Chapter 3, Project Description, the saltwater and brackish marsh areas in the NW Quadrant would be protected by maintaining a setback from the edge of the existing marsh, maintaining high quality stormwater runoff, and keeping the outlet works of the marsh in good working order, to ensure tidal exchange. ARP04 further states that stormwater quality would be monitored, and that the setback would align with the edge of current operations, including the edge of existing pavement and/or storage areas in the McNear's Brickyard storage area. As this component of ARP04 does not comply with the setback requirements for the Baylands Corridor contained in the Countywide Plan Update, Mitigation Measure R4.3-5b is necessary to further mitigate this impact.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-5b: All jurisdictional wetland areas to be avoided shall be protected by setbacks throughout site reclamation and post-reclamation development consistent with the Baylands Corridor designation of the site in the Countywide Plan Update:</p> <ul style="list-style-type: none"> • Setbacks for the NW Quadrant marshes shall be consistent with the requirements of the Baylands Corridor designation for the site. During reclamation activities, no temporary or permanent reclamation stockpiles, berms, or other features shall be placed within 100 feet of the NW Quadrant marshes. Buffers shall be included as part of post-reclamation development design in the vicinity of the NW Quadrant marshes and shall be a minimum of 100 feet in width. • Setbacks for seeps and seasonal wetlands shall be a minimum of 50 feet. 	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • Areas that are avoided and provided with setbacks will be further protected by Best Management Practices (BMPs), as described in Mitigation Measure R4.3-5d below. Such measures include the installation of silt fencing, straw wattles or other appropriate erosion and sediment control methods or devices along roads and at the 100 foot setback limits. Such BMPs shall also be employed if and when reclamation grading and post-reclamation development requires work within the setbacks as described above, between the feature and the activity. <p>R4.3-5c: All necessary jurisdictional wetland permits and approvals of appropriate regulatory agencies shall be obtained prior to each relevant phase of reclamation.</p> <p>R4.3-5d: The applicant shall conduct reclamation activities in a manner that avoids erosion and sedimentation of wetland areas, through implementation of standard BMPs to maintain water quality and control erosion and sedimentation during construction as required by compliance with the General National Pollution Discharge Elimination System (NPDES) Permit for Construction Activities and as established by mitigation measures set forth in Section 4.5, Hydrology and Water Quality.</p> <p>Mitigation measures would include, but would not be limited to, installing silt fencing between jurisdictional waters and project related activities, locating fueling stations away from potentially jurisdictional features, and otherwise isolating construction work areas from any identified jurisdictional features. In addition, BMPs identified in the Long-term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) (Corps, 2001) shall be implemented to prevent degradation of water quality resulting from dredging activities within open waters. These BMPs include: silt fencing and gunderbooms or other appropriate methods for keeping dredged materials from leaving the project site.</p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-6: Reclamation activities and post-reclamation development activities such as dredging, pile driving, jetty construction, and other “in-water” construction activities would result in temporary disturbances to aquatic biological resources and Essential Fish Habitat (Significant).</p>	<p>R4.3-5e: The applicant shall revise the ARP to include as a standard for guiding development of the final Development Plan that post-reclamation residential, commercial, and mixed use development, except as otherwise permitted by BCDC, shall not occur within the 100 foot shoreline band subject to BCDC jurisdiction.</p> <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-6a: Prior to open-water construction activities, the applicant shall obtain the necessary permits from the USACE and other regulatory agencies. Open-water construction will not begin prior to obtaining necessary permits.</p> <p>R4.3-6b: All open-water construction activities shall adhere to the guidelines of the then-current version of the LTMS.</p> <p>R4.3-6c: To minimize wetland disturbance the construction of the connecting channel from the Main Quarry Bowl to the Bay and removal or installation of rip-rap along the Bay shoreline will either operate from dry land or from water-based equipment such as barges, scows, derrick barges, and tugs.</p>	Less than Significant
<p>R4.3-7: Poor water quality in the deep water within the flooded Main Quarry Bowl could occur due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. This condition could result in impacts to special-status aquatic species (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-7: Implement Mitigation Measure R4.5-6 in Section 4.5, Hydrology and Water Quality. As described in Mitigation Measure 4.5-6, no feasible mitigation measure is available to avoid or minimize this impact.</p>	<p align="center"><u>Significant and Unavoidable</u> <u>Since Impact R4.3-7 would occur due to the water quality problems identified in Impact R4.5-6, mitigating Impact R4.5-6 to less than significant through implementation of Mitigation Measure R4.5-6 would also reduce this impact to less than significant.</u></p>
<p>R4.3-8: Reclamation activities conducted in the vicinity of the process water ponds in the NW <u>and SW</u> Quadrants have the potential to adversely impact California red-legged frog (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-8a: ARP04 includes surveys for CRLF in its “Standards for Preserving Sensitive Habitat Areas,” to be conducted prior to filing for grading permits for each reclamation phase, as well as undefined setbacks to be established in the site’s Development Plan.</p>	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<i>Mitigation Measures Identified in this Report</i>	
	<p>R4.3-8b: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW <u>and SW</u> Quadrants in a manner that avoids take of CRLF through surveys to determine whether the species is present, and, if so, to reduce the risk of take of individuals of the species, as specified below. Specifically, the following measures shall be implemented:</p> <ul style="list-style-type: none"> • The project proponent shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines prior to filing for grading permits for Reclamation Phase 1. The habitat assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process water ponds in the NW <u>and SW</u> Quadrants) on the project site • If no CRLF are found during the habitat assessment and/or protocol level surveys associated with Phase 1 reclamation activities then the project proponent shall consult with USFWS as to the necessity of conducting further assessments or surveys for Phases 2 through 4 and/or for post-reclamation development. • If, as a result of the habitat assessment and/or protocol level surveys, CRLF are found on the project site, the project applicant shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the federal Endangered Species Act). Specific measures to protect CRLF shall be determined in consultation with USFWS and may include, but are not limited to, the following measures, which are derived from the USFWS Programmatic Biological Opinion (PBO) for impacts to CRLF. The PBO summarizes typical project effects and provides generic preventive measures designed to substantially reduce the risk of incidental “take” of CRLF within the project area: 	

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> – The name and credentials of a biologist qualified to act as construction monitor shall be submitted to USFWS for approval at least 15 days prior to commencement of work. – A qualified biologist shall conduct pre-construction surveys within aquatic habitat by two weeks prior to the onset of construction activities. Surveys shall be completed for all life cycle stages of CRLF (e.g., egg masses, tadpole, juveniles, and adults) that may occur within the project area. If adult CRLF, tadpoles or eggs are found within the construction disturbance zone, the approved biologist shall contact USFWS to determine if moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved biologist shall be allowed sufficient time to move them from the construction sites before work activities begin. If no frogs are detected during these surveys, construction-related activities may proceed without further requirements for the protection of individuals, although habitat protection measures (i.e., avoidance of intermittent drainages and riparian habitat) shall still be observed. – Exclusionary fencing, such as silt fences, shall be installed around the process ponds and around all construction areas that are within 100 feet of or adjacent to potential CRLF habitat. Once fencing is in place, it shall be maintained by the proponent until completion of construction within or adjacent to the enclosure. – Prior to commencement of any earthmoving activities, the monitoring biologist shall train all construction personnel and work crews on the sensitivity and identification of the CRLF and the penalties for the “take” of this species. In addition, visual materials shall be provided to assist in identifying the species. Training sessions will be repeated for all new employees before they access the project site and periodically throughout project construction. 	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-9: Reclamation activities and post-reclamation development activities conducted in the vicinity of the process water ponds in the NW Quadrant have the potential to impact northwestern pond turtles (Significant).</p>	<p>– The monitoring biologist will demarcate construction avoidance areas in the field and monitor construction activities within 300 feet of aquatic habitat for CRLF. The demarcation shall remain on-site until all initial vegetation clearing and habitat disturbance is completed.</p> <p>– All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from any riparian habitat or water.</p> <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-9: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW Quadrant in a manner that avoids take of northwestern pond turtle through surveys to determine whether the species is present, and, if so, to limit reclamation and post-reclamation development activities as specified below. Specifically, prior to filing for Phase 1 reclamation grading permits, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform northwestern pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant. Surveys and subsequent actions shall include the following:</p> <ul style="list-style-type: none"> • Surveys shall be conducted for nests as well as individuals. • If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas. • No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests. 	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-10: Reclamation activities resulting in the destruction of abandoned buildings or tree removal within the San Rafael Rock Quarry could adversely impact special status bat species (Significant).</p>	<ul style="list-style-type: none"> • If a nest is located within the process pond area and may be impacted by reclamation activities, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG. • A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG. • If no turtles are found during surveys associated with Phase 1 reclamation activities the project proponent shall consult with CDFG regarding the need for further future surveys. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-10: The applicant shall conduct reclamation activities involving tree removal and building demolition in a manner that avoids disturbance or mortality of bats, through surveys to determine whether bats are present, and, if so, to limit reclamation activities as specified below. Specifically, the applicant shall take the following measures to avoid direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula:</p>	<p>Less than Significant</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of all potential bat habitat within 500 feet of reclamation activities prior to initiation of such activities. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night). • Removal of trees or demolition of buildings showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal or building demolition. • A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Bat roosts initiated during construction are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals, including harming, harassing, or killing, will be prohibited. • If pre-construction surveys indicate that roosts are inactive or potential habitat is unoccupied during the reclamation or construction period, no further mitigation is required. Trees and buildings that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished. 	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.3-11: Reclamation activities and post-reclamation development could adversely affect special-status nesting raptors and other nesting birds (Significant).</p>	<ul style="list-style-type: none"> • If known bat roosting habitat is <u>to be destroyed</u> during tree removal or building demolition activities, artificial bat roosts shall be constructed at <u>least two weeks prior to such disturbance</u> in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-11a: ARP04 includes nesting raptor surveys as part of the "Standards for Preserving Sensitive Habitat Areas."</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.3-11b: The applicant shall conduct reclamation and post-reclamation development activities in a manner that avoids direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success. Specifically:</p> <ul style="list-style-type: none"> • During the breeding bird season (January February 1 through August 31) a qualified biologist will survey activity sites for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal. • If reclamation or construction activities occur only during the non-breeding season between September 1 and January <u>December 31</u>, no surveys will be required. • Results of the surveys will be forwarded to CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis. Avoidance procedures shall be reviewed and approved by CDFG. Depending on the species involved, these may include construction buffer areas (up to several hundred feet in the case of raptors) or seasonal restriction of activities. 	Less than Significant
<p>R4.3-12: Post-reclamation residential and commercial development adjacent to marsh habitat could result in long-term adverse impacts to special-status species inhabiting the adjacent marsh habitat through increases in the levels of human noise and activity, lighting, as well as the introduction of domestic animals (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.3-12a: ARP04 proposes to establish buffer areas around the marshes.</p>	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<i>Mitigation Measures Identified in this Report</i>	
	<p>R4.3-12b: The applicant shall submit revisions to ARP04 that include a standard for development of the final Development Plan (to be submitted three years prior to cessation of mining activities) that requires the applicant to conduct post-reclamation development activities in a manner that avoids harassment, disturbance, and mortality of nesting birds and other wildlife that inhabit the SRRQ marshes. The standard will include development of a Marsh Wildlife and Habitat Protection Plan, to be prepared as a part of the Development Plan, and subject to review and approval by the Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. Components of the plan will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> • In accordance with the policies set forth in the Marin Countywide Plan (2007) the project development footprint will maintain a set back of at least 100 feet from marsh habitat on the project site. • Cyclone fencing with vinyl slats for screening shall be installed at the setback distance between the marshes and all residential or commercial development. Appropriate native vegetation will be planted both inside and outside of the fence to provide further screening. The fence will be designed specifically to provide a barrier to exclude cats, dogs, and other household pets from marsh areas and will also provide a visual screen between marsh wildlife and human activity. • To minimize the potentially-adverse effect of night lighting on the adjacent salt marsh habitat the following will be utilized: street lighting only at intersections, low-intensity street lamps and low elevation lighting poles, and internal silvering of the globe or external opaque reflectors to direct light away from marsh habitat. In addition, private sources of illumination around homes shall also be directed and/or shaded to minimize glare into the marsh. 	

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> An education program for residents will be developed including posted interpretive signs and informational materials regarding the sensitivity of the marsh habitat, the dangers of unleashed domestic animals in this area, and discouragement of the practice of feeding feral cats. 	
<i>Impacts of the Amended Surface Mining and Quarrying Permit Identified in this Report</i>		
P4.3-13: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect California red-legged frogs should they occur at the Quarry site (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.3-13: The applicant shall conduct Quarry operations in a manner that avoids take of California red-legged frog. This mitigation measure shall be implemented through the following:</p> <ul style="list-style-type: none"> As a condition of approval of the AQP by the County, and prior to any site disturbing activity within 50300 <u>50300</u> feet of the ponds or fresh water marsh, the applicant shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines. The habitat assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process ponds in the NW <u>and</u> SW Quadrants) on the project site. The project proponent shall provide the County with the results of the habitat assessment, USFWS review, and protocol-level surveys, if required, prior to any site disturbing activity within 50300 <u>50300</u> feet of the subject areas. If no CRLF are found during the habitat assessment or protocol level surveys, then with the concurrence of USFWS, no further mitigation shall be required. 	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>P4.3-14: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect northwestern pond turtle should they occur at the Quarry site (Significant).</p>	<ul style="list-style-type: none"> • If, as a result of the habitat assessment or protocol level surveys, CRLF are found to inhabit the process ponds in the NW <u>and SW</u> Quadrants, the project proponent shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the Federal Endangered Species Act). Consultation will consider whether or not continued use of the process ponds in the NW <u>and/or SW</u> Quadrants is possible without take of CRLF and whether or not a take permit would be required for continued use. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.3-14: The applicant shall conduct Quarry operations in a manner that avoids disturbance to or mortality of northwestern pond turtle. This mitigation measure shall be implemented through the following: As a condition of approval for the AQP by the County and prior to any site disturbing activity within 50300 <u>50300</u> feet of the NW Quadrant process water ponds, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform western pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant.</p> <ul style="list-style-type: none"> • Surveys shall be conducted for nests as well as individuals. • If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas. • No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests. 	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>P4.3-15: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge (Significant).</p>	<ul style="list-style-type: none"> • If a nest is located within the process pond area and may be impacted by Quarry associated operations, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG. • A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.3-15: The applicant shall conduct Quarry operations in a manner that avoids direct losses of nests, eggs, and nestlings and potential indirect impacts to avian breeding success resulting from vegetation removal as well as variability in quarrying activity levels on South Hill. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> • During the breeding bird season (February <u>January</u> 1 through August 31) a qualified biologist will survey sites for nesting raptors and passerine birds not more than 14 days prior to any vegetation removal (including trees, shrubs, scrub, and grassland vegetation). In addition, vegetation on South Hill will be surveyed if quarrying activities on South Hill cease for a period of more than one week during breeding bird season. • Surveys shall also be conducted during breeding season in those areas of the project site that a qualified biologist determines may have nesting special status bird species present that could potentially be impacted by indirect noise impacts of operations such as truck traffic or blasting at that time. 	<p>Less than Significant</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>P4.3-16: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status bats at the Quarry site (Significant).</p>	<ul style="list-style-type: none"> • If vegetation removal or cessation of mining activities on South Hill occurs only during the non-breeding season, between September 1 and January <u>December</u> 31, no surveys will be required. • Results of the surveys will be forwarded to the County and CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis that will ensure that the potential for an impact on any nesting raptors or passerine birds is eliminated. Depending on the species, these can include buffer areas (up to several hundred feet in the case of raptors) or seasonal avoidance. Vegetation of any kind identified as supporting active nests will not be removed until nestlings have fledged. If survey results are positive for nesting birds, vegetation removal or mining on South Hill will not occur until submittal and review of reports and implementation of any necessary avoidance measures. Special-status bird sightings shall also be submitted to the CNDDDB. <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.3-16: The applicant shall conduct Quarry operations in a manner that avoids direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> • A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of trees slated for removal as a result of quarrying activity. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night). 	<p>Less than Significant</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • Removal of trees showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal. • A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Active bat roosts located within 500 feet and line of sight of existing centers of Quarry activities are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals will be prohibited. • If surveys indicate that roosts are inactive or potential habitat is unoccupied, no further mitigation is required. Trees that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished. • If known bat roosting habitat is <u>to be</u> destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed <u>at least two weeks prior to such disturbance</u> in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist. • Prior to quarry-related tree removal a report shall be submitted to the County that details the survey results and any actions taken to protect special-status bats. Any special-status bat sightings shall also be submitted to the CNDDB. 	
P4.3-17: Ongoing quarrying activities under an Amended Surface Mining and Quarrying Permit may result in degradation of San Rafael Rock Quarry marsh habitat (Less than Significant).	None required.	

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i>		
C4.3-18: Impacts of the ARP and AQP on the salt marshes present at the project site would make a considerable contribution to cumulative impacts on marsh habitat (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>C4.3-18a: See Mitigation Measure CR4.3-5a.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>C4.3-18b: The applicant shall prepare a Tidal Marsh Restoration plan and implement the recommendations as soon as practicable, and in any case, shall complete the tidal marsh restoration prior to completion of Phase 1 reclamation. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> • The project proponent shall develop and submit a Tidal Marsh Restoration plan to the County and other applicable resource agencies within 1 year of approval of the AQP. The Plan will include, but not be limited to, the following elements: <ul style="list-style-type: none"> – A baseline study of existing marsh conditions, including topography, a complete analysis of current hydrology, vegetation, and wildlife that will be used to inform subsequent marsh restoration planning. – <u>A thorough analysis of the potential effects of tidal restoration on adjacent infrastructure and existing marsh vegetation.</u> – <u>Development of a suite of restoration alternatives, with tidal restoration as the preferred alternative, providing constraints do not preclude this course of action.</u> – Feasible goals for marsh restoration with quantifiable objectives that can be measured over time to determine whether goals are being met. – A detailed plan for marsh restoration, including, if necessary to achieve objectives, plans for excavation of new channels, addition of new culverts, setbacks, buffers, etc. – An operations schedule for the existing tide gates that will provide for twice daily tidal inundation of the SRRQ marshes. 	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> - A maintenance schedule for the <u>any mechanical devices or features, such as tide gates, specified in the plan.</u> - A monitoring plan to determine optimum inundation levels for the marshes. This would include measurements of hydrology, sediment accretion, and changes in vegetation over time. 	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> - A schedule for annual monitoring reports, which shall be submitted to the Community Development Agency <u>Department of Public Works</u>, as well as all permitting agencies as required. 	
Geology, Soils, and Seismicity		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.4-1: Prior to the completion of site reclamation, the project site could be subject to slope instability hazards, including landslides, debris flows, and rockfalls caused by seismic or non-seismic mechanisms (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.4-1: The applicant shall include the recommendations made in the Supplemental Geotechnical Data Report Proposed Changes to Mining Plan by ENGEO, Incorporated dated April 11, 2005 as part of the proposed project. These recommendations include conducting supplemental geotechnical pit observations, groundwater monitoring, and slope monitoring which shall be conducted by a California Certified Engineering Geologist or Registered Professional Geotechnical Engineer with oversight by the State Office of Mine Reclamation. In addition, the average slope inclination shall not exceed 60 degrees for a maximum vertical height of 350 feet, a minimum of 30-foot-wide benches shall be constructed at maximum 90-foot intervals, and inter-bench face inclinations shall not exceed 75 degrees.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>None.</p>	Less than Significant
R4.4-2: Soil erosion of exposed cut or fill slopes, native slopes with removed vegetation, and soil stockpiles could result in soil erosion and loss of topsoil (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.4-2a: The applicant has prepared a Stormwater Management Plan and Stormwater Pollution Prevention Plan that specifies best management practices for reducing erosion and sedimentation. <u>The applicant has also prepared Standards for Stormwater and Erosion Control of Reclaimed Areas and Standards for Revegetation of Reclaimed Areas, both of which will apply to reclamation activities (see Chapter 3, Project Description).</u></p>	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
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Mitigation Measures Identified in this Report

R4.4-2b: Mitigation Measure R4.4-2b: The project applicant shall incorporate into the grading and construction specifications provisions requiring that all phases of construction implement best management practices (BMPs) to reduce and eliminate soil erosion and loss of topsoil. The contractor shall implement these BMPs, and the contractor shall be responsible for the inspection and maintenance of the BMPs through all phases of reclamation.

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
R4.4-3: Unstable slopes or soils could adversely affect post-reclamation land uses of the Quarry site (Significant).	<p>Mitigation Measure R4.5-4 R4.5-2b in Section 4.5, Hydrology and Water Quality, also contains measures that would serve to further mitigate potential erosion effects.</p> <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.4-3a: The proposed grading and other earthwork activities included in ARP04 would be designed such that all potential development areas would be located on either bedrock or consolidated engineered fill, with known and predictable strengths and stability.</p> <p>R4.4-3b: The geotechnical recommendations provided in the Supplemental Geotechnical Data Report, which are being implemented as part of the project (see Mitigation Measure R4.4-1) include the preparation of a design-level geotechnical investigation following the cessation of mining.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.4-3c: The additional studies recommended in the Supplemental Geotechnical Data Report and specified in Mitigation Measure R4.4-3b will include a study to determine how the site may be developed following reclamation in order to avoid or mitigate to less than significant impacts related to soil and slope stability.</p> <p>At the time the study is prepared, there will be a greater understanding of the bedrock stability and the properties and performance of the Quarry walls. A comprehensive re-evaluation of slope stability shall be performed based on results from geotechnical observations throughout the mining period, groundwater monitoring, slope monitoring, and laboratory testing of on-site materials which would include compression tests and shear tests of joint surfaces.</p>	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<p>The design-level, site-specific geotechnical investigation shall be prepared by a California licensed Geotechnical Engineer or Certified Engineering Geologist and include review of the supplemental geotechnical evaluations and monitoring conducted throughout the history of mining activities. The investigation shall include final grading recommendations, mitigation of any identified compressible or liquefiable soils, slope stability analyses, calculation of factors of safety, and structural foundation recommendations to ensure that post-reclamation development will be in accordance with the then-current requirements of the California Building Code and the Marin County Building and Safety Division or City of San Rafael Building Code. These recommendations shall be incorporated into the final design plans for post-reclamation development.</p> <p>R4.4-3d: If the design-level, site-specific geotechnical investigation specified above determines that achievement of factors of safety adequate for the intended post-reclamation uses are infeasible in some or all of the reclaimed Quarry, the report shall specify appropriate alternative post-reclamation uses or limitations on the planned use.</p>	
Hydrology and Water Quality		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.5-1: The proposed project could alter current groundwater conditions beneath the site and interfere with groundwater resources on adjacent properties or local groundwater recharge (Less than Significant).	None required.	
R4.5-2: Grading associated with the proposed project would increase the potential for eroded sediments to degrade the quality of surface water sources including the San Francisco Bay (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.5-2a: ARP04 includes a Stormwater Management Plan and Stormwater Pollution Prevention Plan, both of which will be implemented as part of the project.</p>	Less than Significant

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<i>Mitigation Measures Identified in this Report</i>	
	<p>R4.5-2b: The applicant shall include as part of the SWPPP and Stormwater Management Plan, a monitoring and maintenance element that would require scheduled periodic monitoring of BMP performance and condition. At a minimum, stormwater and erosion control BMPs shall be monitored after major storms, prior to the first rain event, and midway through large storm events extending over several days. Temporary BMPs (e.g., fiber rolls) shall be monitored for performance and immediately replaced if necessary. Performance and failure of BMPs shall be described in the annual report to the RWQCB as required under the SWPPP. Monitoring and maintenance shall be conducted by an erosion control specialist contracted by the applicant. Monitoring and maintenance reports shall be filed with the applicant and available to the County on request.</p>	
R4.5-3: Sedimentation inside entrance channel due to both tidal currents and bank material slumping may be substantial and result in the need for periodic dredging operations and water quality impacts (Less than Significant).	None required.	
R4.5-4: Project construction would involve activities (excavation, soil stockpiling, boring and pile driving, grading, and dredging, etc.) that would generate loose, erodable soils that, if not properly managed, could affect stormwater runoff and violate applicable water quality standards or waste discharge requirements; or otherwise substantially degrade water quality (Less than Significant).	None required.	
R4.5-5: The proposed flooding of the Main Quarry Bowl would result in a deep body of water that may have insufficient water circulation and increased residence time. This condition could degrade water quality within the shallower water in the harbor (Less than Significant).	None required.	
R4.5-6: Poor water quality conditions could occur in the deep water within the flooded Main Quarry Bowl due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin (Significant).	<p style="text-align: center;"><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p>	<p>Due to the potential infeasibility of available mitigation measures discussed above, the impact remains Significant and Unavoidable. Mitigation Measure 4.5-6 will ensure that this impact is reduced to less than significant.</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.5-6: <u>Within one year of approval of the Amended Reclamation Plan, the applicant shall submit a concept engineering and economic report for use and future maintenance of a mechanical mixing or aeration system, or another engineered approach, that will result in avoidance or elimination of a stratified water column within the Main Quarry Bowl after it is flooded. The report will be conducted by qualified limnologists and water quality engineers. The system design will be at a schematic level and will be stamped by a California professional engineer, and will include calculations that demonstrate that the system will maintain water quality objectives established in the San Francisco Bay Regional Water Quality Control Board's Basin Plan. The report will include an analysis of operating and maintenance costs for the system, as well as predicted energy requirements and greenhouse gas emissions, and a plan for minimizing both of these; and will identify a funding source to ensure continued operation of the system after reclamation. Reducing the depth of the Main Quarry Bowl prior to flooding would result in a harbor with an average depth similar to the remainder of San Pablo and San Francisco Bay. To accomplish this, the Main Quarry Bowl would need to be backfilled from its proposed final depth of 400 feet to a finished depth of approximately 30 to 40 feet. The backfill material could be any inert solid material and possible materials could range from dredge spoils to construction debris. It would be expected that most, if not all materials would have to be trucked into the site or offloaded and placed in the quarry using the applicant's barge dock. Prior to filling the Main Quarry Bowl, the backfilled materials would have to be covered using a low permeability cap material such as clay or Bay Mud. The cap material would need to be certified as clean fill. There would be several potentially substantial secondary impacts for such a mitigation measure, which include increased truck trips and/or barge trips, increased use of the barge loading area, and associated diesel particulate air quality impacts. This mitigation measure would significantly alter the project as a whole and the overall project schedule, and in conjunction with potentially substantial adverse secondary effects, is deemed not to be feasible as mitigation for the project as proposed. The backfilling of the quarry bowl to reduce water depth to meet water quality</u></p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.5-7: The creation of the harbor basin may impact the currents, flow patterns, and water quality conditions in San Francisco Bay. Changes in circulation and water quality would be minimal beyond the entrance to the harbor/marina and only occur in close proximity to the entrance channel. Therefore, the project would not significantly alter currents, flow patterns, and water quality of San Francisco Bay (Less than Significant).</p>	<p>standards is considered in the Alternatives analysis of this EIR, as a component of the Mitigated Alternative. Other Alternatives considered included not breaching the bowl and utilizing it as a fresh water storage reservoir, (at a lower water depth), or retaining the bowl unfilled for an alternate end use.</p> <p>Two alternate mitigation measures could include some type of deep water oxygenation/ aeration procedure or opening another channel on an opposing side of the harbor to allow a greater degree of deep water mixing. According to our analysis, oxygenation/aeration would be difficult to present as mitigation because, considering the depths of the proposed harbor, the technology may not currently exist. Cutting an opposing channel may increase mixing but may not mix water at depth. The effectiveness of a second channel to mitigate this impact would require additional modeling and geotechnical study. These measures are therefore also deemed not to be feasible for the project as proposed.</p> <p>None required.</p>	
<p>R4.5-8: The project reclamation and post-reclamation activities would result in an increase in the possibility of inundation by a mudflow, seiche, tsunami, or sea level rise (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.5-8: Prior to implementation of Phase 4 reclamation, the Quarry shall model effects of the maximum expected tsunami, seiche event, and anticipated sea level rise, considering the latest climate change information, and county policies and regulations in effect at the time, and proposed adequate setback and final contour elevations in a report to the County. A revised Phase 4 reclamation plan shall be submitted as appropriate.</p>	<p>Less than Significant</p>

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
R4.5-9: Filling the Main Quarry Bowl with waters of the San Francisco Bay could cause localized flooding hazards (Less than Significant).	None required.	
R4.5-10: Post-reclamation development could produce stormwater runoff that would result in a degradation of surface water quality (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.5-10: The applicant shall submit a revised ARP that includes standards for preventing polluted stormwater runoff from entering the Main Quarry Bowl after it is flooded. The standards will be used to guide development of the final Development Plan, due to be submitted three years prior to the anticipated completion of mining.</p>	Less than Significant
<p>Land Use and Planning</p> <p><i>Impacts of the Amended Reclamation Plan</i></p>		
R4.6-1: The project would not convert agricultural land to nonagricultural uses or impair the productivity of prime agricultural land (Less than Significant).	None required.	
R4.6-2: Proposed post reclamation development of the site would not generally conflict with Bay Conservation and Development Commission and City of San Rafael General Plan policies (Less than Significant).	None required.	
R4.6-3: ARP04 would conflict with existing uses at the periphery of the project site as a result of incompatible land uses (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.6-3a: As stated in Section 4.7, as a project mitigation, SRRQ proposes to construct a berm along the northern border of the NE Quadrant, and to retrofit all rolling vehicles at the Quarry with broadband backup alarms. Broadband alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), by being 5 dBA quieter than conventional back-up alarms, and by generating noise that has a less intrusive tonal quality.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.6-3b: Implement Mitigation Measure R4.7-1b.</p>	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<p>R4.6-3c: In addition to the requirements of Mitigation Measure R4.7-2, implementation of the following construction noise abatement measures would reduce the annoyance impact of construction and reclamation activity noise.</p> <ul style="list-style-type: none"> • The applicant shall limit all reclamation grading activities in the NE Quadrant to 7:00 a.m. to 5:00 p.m. Monday through Friday. • Equipment and trucks used for all reclamation activities shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds). • All construction equipment powered by internal combustion engines shall be properly muffled and maintained; • Unnecessary idling of internal combustion engines shall be prohibited. <p>R4.6-3d: Each year by May 1 and not later than 30 days prior to the commencement of reclamation activities, SRRQ shall inform by mail all residences on Marin Bay Park Court, Heritage Drive, and San Marino Drive, and the public at large of the start date, nature of the work, and expected duration of the 8-10 week period during which reclamation grading activities will occur that year.</p>	
R4.6-4: The project would not result in the conversion of open space to urban- or suburban-scale development (Less than Significant).	None required.	
R4.6-5: Activities associated with the phased implementation of the reclamation plan would conflict with County Code Title 22 (Section 22.112.020) restrictions on nonconforming uses (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.6-5a: ARP04 proposes to limit reclamation grading activities to an 8-10 week period during each dry season.</p> <p><i>Mitigation Measures Identified in this Report</i></p>	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<p>R4.6-5b: Although the effects of the intensification of site activities resulting from the reclamation plan cannot be precisely quantified, implementation of Mitigation Measure R4.6-3b, above, regarding noise, and measures to control dust currently being implemented, required by existing permits, proposed by the applicant or identified in this EIR as discussed at Impact 4.2-1 and Impact 4.2-2 in Section 4.2, Air Quality, would help reduce the environmental effects of intensified site use on land uses adjacent to the site.</p>	
<i>Impacts of the Amended Surface Mining and Quarrying Permit</i>		
<p>P4.6-6: The Amended Surface Mining and Quarrying Permit would allow for an intensification of quarry operations beyond 1982 levels, in excess of the Quarry's legal nonconforming use under Title 22 of the County Code (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>P4.6-6a: The applicant proposes to limit daily truck traffic to 250 one-way trips per day (125 in and 125 out). This appears to be less than the daily average during the period 1980-1982.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.6-6b: Quarry operations shall be limited to the levels of intensity extant in 1982, at the time that the Quarry became a legal nonconforming use. This will include the following:</p> <ul style="list-style-type: none"> • Maximum annual production shall be limited to the level of production in 1982, i.e., 1,473,000 tons per year; • Operations shall be limited to those in place in 1982, i.e., noise-generating operations will be limited to daylight hours on weekdays, except during a declared emergency; • Blasting shall be limited to <u>approximately an annual (calendar year) average of two times per week (104 times per year).</u> 	Less than Significant
<i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i>		
<p>C4.6-7: Continuing operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit and simultaneous phased reclamation grading under the Amended Reclamation Plan would result in continuing incompatibility with neighboring residential and recreational land uses (Significant).</p>	No additional mitigation has been found to be feasible.	Significant and Unavoidable

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
Noise and Vibration		
<i>Impacts of the Amended Reclamation Plan</i>		
<p>R4.7-1: Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations (Beneficial).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.7-1a: All rolling vehicles at the Quarry are retrofitted with broadband backup alarms. Broad band alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), be being 5 dBA quieter than conventional back-up alarms and by generating noise that is has a less intrusive tonal quality (Brigade Electronics, 2007; Hub-4, 2007).</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.7-1b: Implementation of the following construction noise abatement measures would reduce the impact of temporary construction noise. Because of its temporary nature, berm construction noise impacts would be similar to those resulting from site preparation and grading of most general development projects.</p> <ul style="list-style-type: none"> • The applicant shall limit berm construction to 7:00 a.m. to 5:00 p.m. Monday through Friday; • Equipment and trucks used for berm construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds); • All construction equipment powered by internal combustion engines shall be properly muffled and maintained; 	<p>While construction noise abatement measures would reduce the impact of temporary construction noise, by restricting hours of operation and promoting operational restrictions, it is unlikely that a reduction of construction noise to 58 dBA at the nearest residences would be achieved. Although temporary in nature, berm construction noise impacts would result in an increase of greater than 6 dBA over existing levels and would be considered Significant and Unavoidable, though temporary, even with mitigation.</p>

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> Unnecessary idling of internal combustion engines shall be prohibited. 	
R4.7-2: Construction of the surcharge berm in the NW Quadrant would result in temporary construction noise (Less than Significant) but would also result in a noise buffer for daily operations (Beneficial).	None required.	
R4.7-3: Mixing of pond fines in the NE Quadrant would involve the use of heavy duty equipment, which would generate noise at nearby sensitive receptors (Less than Significant).	None required.	
R4.7-4: Post-reclamation land uses proposed under the 2004 Amended Reclamation Plan (ARP04) would result in increased ambient noise (Less than Significant).	None required.	
<i>Impacts of the Amended Surface Mining and Quarrying Permit</i>		
P4.7-5: Continued operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit would result in increased ambient noise levels above baseline levels (Less than Significant).	None required.	
P4.7-6: Continued operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit would expose residents along Point San Pedro Road to traffic-related noise (Less than Significant).	None required.	
P4.7-7: Continued blasting at the Quarry would expose neighbors of San Rafael Rock Quarry to vibrations that exceed human annoyance levels (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>P4.7-7a: The AQP contains the following provisions to limit the adverse effects of blasting:</p> <ul style="list-style-type: none"> Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.5 inches per second. 	<p>The measures will ensure that blasting at SRRQ will not cause structural damage to nearby residential buildings. These measures will also reduce to the extent practical the disturbing effects of blasting on the Quarry's neighbors. It is likely, however, that such effects will continue. The level of continuing impact may be considered below the threshold of significance; the inevitable and ongoing disturbance of neighbors is another aspect of the incompatibility of the Quarry with surrounding land uses, in Impact 4.6-7 4.6-4 in Section 4.6, Land Use and Planning.</p>

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<ul style="list-style-type: none"> • The quarry shall provide 36 hours advance notification of blasting to local residents and to the County of Marin by posting the date and approximate time of scheduled blasts on a web site. • Blasting shall be limited to the hours of 11:30 a.m. to 1:30 p.m. Monday through Friday. No blasting is to occur on State holidays or weekends. <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.7-7b: Implementation of the following would reduce the impact of vibration and air-overpressure from rock blasting activities:</p> <ul style="list-style-type: none"> • Blasts should be designed to maintain a minimum scaled distance of 52.8 ft/lb^{1/2}, as defined in the Revey Associates report (Appendix J). • Corresponding to the scale distance, the ground motion should not exceed 0.25 inches per second peak particle velocity. • All charges should be confined with clean crushed stone of height equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report. Air-overpressure measured near residential home should never exceed 133 dBL, as measured with 2-Hz monitoring equipment. • All charges should be confined with rock burden equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report. <p>All blast monitoring of ground motion and air-overpressure effects done by either SRRQ personnel or third-party service providers should be done in full conformance with ISEE guidelines provided in Attachment I of the Revey Associates report (Appendix J)</p>	

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**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i>		
C4.7-8: The proposed Amended Reclamation Plan would result in an increase in on-site equipment operations as a result of reclamation activities being conducted simultaneous with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. These increased equipment operations would increase noise levels generated on site and may affect off-site receptors (Less than Significant). Hazardous Materials <i>Impacts of the Amended Reclamation Plan</i>	None required.	Less than Significant
R4.8-1: Hazardous materials transported or used onsite during proposed mining and reclamation activities (i.e., petroleum products,) could be spilled or otherwise released through improper handling or storage (Significant).	<i>Mitigation Measures Proposed as Part of the Project</i> R4.8-1a: SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan. <i>Mitigation Measures Identified in this Report</i> R4.8-1b: SRRQ shall maintain and periodically update its Hazardous Material Business Plan during the entire reclamation period.	Less than Significant
R4.8-2: Reclamation activities at the project site could expose structures, on-site workers, and nearby residents to hazards associated with wildland fires (Less than Significant).	None required.	
<i>Impacts of the Impacts of the Amended Surface Mining and Quarrying Permit</i>		
P4.8-3: Transport, storage, and use of explosives could result in accidental explosions or exposure to hazardous substances (Significant).	<i>Mitigation Measures Proposed as Part of the Project</i> P4.8-3a: As previously described under Mitigation Measure R4.8-1a, SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.	Less than Significant

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TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<i>Mitigation Measures Identified in this Report</i>	
	<p>P4.8-3b: The applicant shall prepare and maintain a blasting plan that describes how the Quarry will consistently comply with applicable blasting regulations and standards of practice. The blasting plan will contain a complete description of clearing and guarding procedures; descriptions of how explosives will be safely transported, stored, and used at the site in accordance with applicable regulations; evacuation, security and fire prevention procedures; blasting equipment list, and procedures for notification of nearby receptors in the event of an accident or emergency involving explosives. The blasting plan shall incorporate the recommendations contained in the Revey Associates, Inc. report (pp. 23-24) attached as Appendix J. The blasting plan must be prepared within six months of approval of the AQP. The plan will be subject to review and approval by the County Department of Public Works.</p>	
Public Services, Utilities, and Energy		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.9-1: The project would require fire protection and emergency medical services from the Marin County Fire Department and the San Rafael Fire Department (Less than Significant).	None required.	
R4.9-2: The project would require police protection and traffic enforcement services of the Marin County Sheriff's Department and the San Rafael Police Department (Less than Significant).	None required.	
R4.9-3: The project could place burdensome demands on public water supplies, exceeding available capacity, especially during periods of drought (Less than Significant)	None required.	
R4.9-4: Post-reclamation development would require system upgrades and new service connections and place additional demands on wastewater treatment facilities (Less than Significant).	None required.	
R4.9-5: The project would generate solid waste and place a greater demand upon landfill capacity (Less than Significant).	None required.	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.9-6: Reclamation activities and intended post-reclamation development would increase demand for electricity and natural gas and involve greater energy expenditures (Less than Significant).</p> <p>Transportation and Traffic</p> <p><i>Impacts of the Amended Reclamation Plan</i></p>	None required.	
<p>R4.10-1: The project would generate vehicle trips as a result of reclamation activities being conducted simultaneous with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan (ARP82) (Less than Significant).</p>	None required.	
<p>R4.10-2: The proposed Amended Reclamation Plan would result in post-reclamation development similar to that proposed in the 1982 Amended Reclamation Plan. These future land uses would generate vehicle trips on area roadways (Less than Significant).</p> <p><i>Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined</i></p>	None required.	
<p>C4.10-3: Cumulative transportation impacts would result from additional quarrying activities implemented under the amended Surface Mining and Quarrying Permit, which would be used to achieve increased excavation depths and lateral extents in the Main Quarry Bowl, simultaneous with proposed new reclamation activities. These increased vehicle trips associated with mining equipment and truck trips would increase traffic volumes on area roadways and contribute to deterioration of road surfaces (Less than Significant).</p> <p>Population and Housing</p> <p><i>Impacts of the Amended Reclamation Plan</i></p>	None required.	
<p>R4.11-1: Post-reclamation residential development would result in an increase in the residential population within the area (Less than Significant).</p>	None required.	
<p>R4.11-2: The project could result in an increase in employment within the Amended Reclamation Plan Area (Less than Significant).</p>	None required.	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
Cultural Resources		
<i>Impacts of the Amended Reclamation Plan</i>		
R4.12-1: Phased reclamation grading activities could result in adverse effects to prehistoric or unique archaeological resources, including those previously unidentified (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.8-12a R4.12-1a (applies to all project phases): In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Agency Director.</p> <p>R4.8-12b R4.12-1b (applies to all project Phase 4 of reclamation grading): The applicant shall retain the services of a qualified archaeological consultant who has expertise in California prehistory to review reclamation grading plans and identify areas of potential concern, including previously undisturbed or minimally disturbed areas. The archeological consultant shall monitor all ground-disturbing or vegetation removal activities in identified areas of concern during construction to ensure that any previously undiscovered cultural resources are properly identified and preserved or otherwise mitigated in accordance with prevailing professional standards and Public Resources Code §21083.2. If an intact archaeological deposit is encountered, all soil-disturbing</p>	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
	<p>activities in the vicinity of the deposit will cease. The archaeological monitor will be empowered to redirect crews and heavy equipment until the deposit is evaluated. The monitor will immediately notify the Marin County Department of Public Works of the encountered archaeological deposit. The monitor will, after making a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, present the findings of this assessment to Marin County. If Marin County, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, the applicant shall take steps to:</p> <ul style="list-style-type: none"> • Redesign the project to avoid any adverse effects on the significant archaeological resource; or • Develop and implement an archaeological data recovery program (ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance and that interpretive use of the resource is feasible). If the circumstances warrant an archaeological data recovery program, an ADRP will be conducted that will preserve and recover important archeological data from the find, to the extent that adverse effects will be avoided. The project archaeologist will consult with Marin County to determine the scope of the ADRP. The archaeologist will prepare a draft ADRP that will be submitted to Marin County and the state Office of Historic Preservation for review and approval. The ADRP will identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP will identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods will not be applied to portions of the archaeological resources if nondestructive methods are practical. 	

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
R4.12-2: Activities associated with proposed phased reclamation grading could have an adverse effect on paleontological resources (Less than Significant).	None required.	
R4.12-3: Construction of the top soil stockpile fill area "F" under Phase 1 of the proposed project would demolish or substantially alter the c. 1910 Caretaker's Residence, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5 (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.12-3a: The project sponsor shall relocate the top soil stockpile fill area "F" under Phase 1 of the proposed project, to avoid potentially adverse effects to the Caretaker's Residence. The fill area could be relocated either to the east or to the west of this potentially eligible historic resource, or split into two smaller stockpiles, to avoid the resource.</p> <p>R4.12-3b: Prior to commencement of Phase 1 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing stockpiles and haul routes, and protection of historic resources. The plan will clearly show how the Caretaker's Residence and other potentially eligible historic resources will be protected and preserved.</p>	Less than Significant
R4.12-4: Construction of the surcharge berm under Phase 2 of the proposed project would demolish or substantially alter the McNear's Brickyard c. 1902 Boarding House and Office, two potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5 (Significant).	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.12-4a: The project sponsor shall relocate and/or redesign the surcharge berm proposed under Phase 2 of the proposed project, to avoid potentially adverse impacts to the Boarding House and Office structures. The north-south leg of the berm could be narrowed to avoid these resources, allowing more fill to occur on the east-west portion of the berm. To ensure adherence to this mitigation measure, prior to commencement of Phase 2 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing the precise location of the surcharge berm, as well as areas that will be used to support construction of the berm. The plan will clearly show how the Boarding House and Office structures and other potentially eligible historic resources will be protected and preserved.</p>	Less than Significant

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SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.12-5: Reclamation activities in the SW Quadrant under Phase 3 of the phased grading plan may demolish or substantially alter the former c. 1935 U.S. Army Signal House, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5 (Significant).</p>	<p>R4.12-4b: If relocation or alteration of the surcharge berm will affect the geotechnical properties of the site required for intended post-reclamation development, the applicant shall revise the conceptual design for the NW Quadrant Reclamation Plan accordingly.</p> <p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.12-5a: The project sponsor shall redesign the reclamation activities in the SW and NW Quadrants under Phase 3 of the proposed project to avoid potentially adverse impacts to the former c. 1935 U.S. Army Signal House. The southernmost limits of the reclamation activity area could be reduced by approximately 100 feet to avoid this historic resource, potentially allowing more reclamation activities to occur on the northern, eastern, or western portions of SW-3.</p> <p>R4.12-5b: The provisions of Mitigation Measures R4.12-3 and R4.12-4a to protect the Caretaker's residence and the McNear's Brickyard Boarding House and Office shall be kept in place for Phase 3 reclamation grading.</p> <p>R4.12-5c: To ensure adherence to mitigation measures R4.12-5a and b, prior to commencement of Phase 3 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing reclamation grading activities. The plan will clearly show and describe how the affected potentially historic resources, including the c 1935 U.S. Army Signal House, the Caretaker's residence, and the McNear's Brickyard Boarding House and Office structures, as well as any other potentially eligible historic resources will be protected and preserved.</p>	<p>Less than Significant</p>

NOTE:

R = Impacts prefaced by an "R" would result from approval of the ARP

P = Impacts prefaced by a "P" would result from approval of the AQP

C = Impacts prefaced by a "C" would result from the cumulative impact of the two projects

TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<p>R4.12-6: Reclamation grading phase 4 of the 2004 Amended Reclamation Permit would demolish four potentially eligible historic buildings at McNear's Brickyard, including 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4)c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. Even with the possible retention of Hoffman Kiln #1 under the Amended Reclamation Plan, Phase 4 would additionally alter the historic setting of Hoffman Kiln #1 to the extent that it would no longer qualify for listing in the National Register of Historic Places or California Register of Historic Resources (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>R4.12-6a: The ARP states that one of the Hoffman Kilns and its stack may be retained in the post-reclamation development.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>R4.12-6b: The project sponsor shall revise the applicable portion of ARP04 to specify preservation of the following four historic resources: 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4) c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. The neighborhood commercial uses proposed for the NW Quadrant shall be constructed to provide a sufficient setback to allow these structures to visually 'read' as a working brickyard, with all original components of the brickmaking industry intact.</p>	Less than Significant
<p>R4.12-7: Other reclamation grading activities could impact additional Historic Resources (Less than Significant).</p>	None required.	
<p>R4.12-8: Proposed reclamation activities could have adverse impacts on adjacent, off-site historic resources (Less than Significant).</p>	None required.	
<p><i>Impacts of the Amended Surface Mining and Quarrying Permit</i></p>		
<p>P4.12-9: Continued quarrying at the project site could adversely affect prehistoric or unique archaeological resources, including those previously unidentified (Significant).</p>	<p><i>Mitigation Measures Proposed as Part of the Project</i></p> <p>None.</p> <p><i>Mitigation Measures Identified in this Report</i></p> <p>P4.12-9: In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the</p>	

NOTE:

R = Impacts prefaced by an "R" would result from approval of the ARP

P = Impacts prefaced by a "P" would result from approval of the AQP

C = Impacts prefaced by a "C" would result from the cumulative impact of the two projects

**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
P4.12-10: Continued quarrying at the project site may have a potential adverse effect on paleontological resources (Less than Significant).	resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may commence without approval of the Agency Director. None required.	
Cumulative Impacts		
<i>Aesthetics</i>		
C5-1: The potential for the AQP to produce new sources of light and glare could combine with similar effects associated with the development of the Village at Loch Lomond Harbor, as well as past development of the Peacock Gap Neighborhood, to create a cumulative effect (Less than Significant).	None required.	
C5-2: Continued mining operations enabled under ARP04, in conjunction with planned phased reclamation in the ARP04, may contribute to a change in visual quality in the Point San Pedro area (Less than Significant).	None required.	
<i>Air Quality</i>		
C5-3: The project would add incrementally to cumulative air pollutant emissions (Significant).	No other mitigation measures (beyond Implement Mitigation Measures R4.2-1a through j h) are identified. and R4.2-2a and b.	<u>Significant and Unavoidable Because Mitigation Measures R4.2-1 and R4.2-2 would reduce the corresponding impacts to less than significant, the contribution of the residual impacts would not be considered cumulatively considerable; therefore, the cumulative impact is reduced to less than significant as well.</u>
C5-4: Greenhouse Gas Emissions of the ARP and AQP would add to global greenhouse gas emissions and contribute to global climate change (Less than Significant).	None required.	

NOTE:

R = Impacts prefaced by an "R" would result from approval of the ARP

P = Impacts prefaced by a "P" would result from approval of the AQP

C = Impacts prefaced by a "C" would result from the cumulative impact of the two projects

**TABLE 2-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE SAN RAFAEL ROCK QUARRY ARP AND AQP (continued)**

Environmental Impact (Significance Level)	Mitigation Measures	Level of Significance after Mitigation
<i>Biological Resources</i>		
C5-5: Implementation of the proposed AQP and proposed ARP together, and, in combination with other past, present, and reasonably foreseeable future projects, could result in significant cumulative impacts on the biological resources of the Point San Pedro Area (Less than Significant).	None required.	

NOTE:

R = Impacts prefaced by an "R" would result from approval of the ARP

P = Impacts prefaced by a "P" would result from approval of the AQP

C = Impacts prefaced by a "C" would result from the cumulative impact of the two projects

CHAPTER 3

Project Description

3.1 Project Site Location and Description

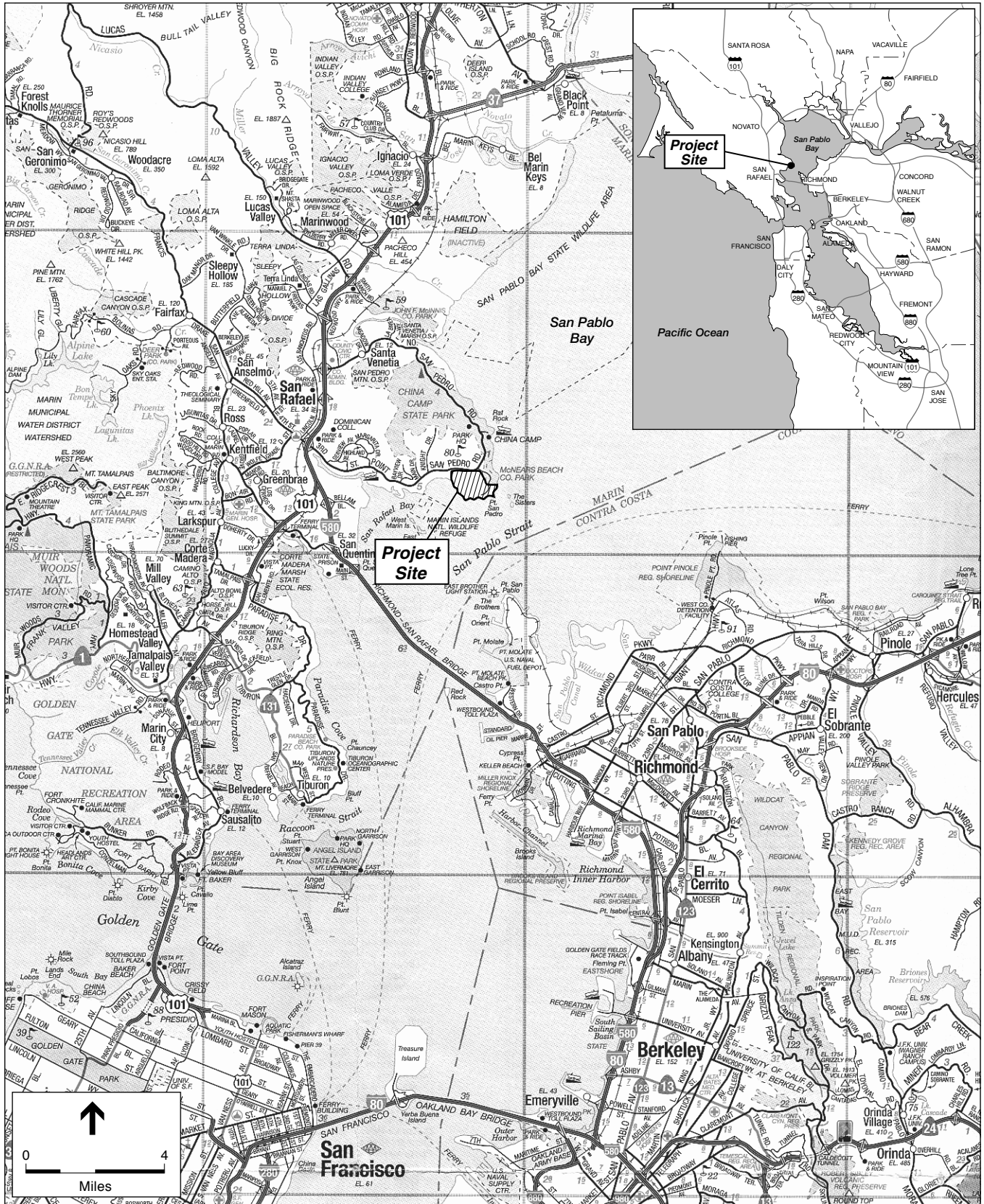
This chapter includes a description of the two projects at the San Rafael Rock Quarry (SRRQ) that are the subject of this ~~Draft~~ Final Environmental Impact Report (EIR). The two projects are a revised Amended Reclamation Plan (ARP) and an Amended Surface Mining and Quarrying Permit (AQP). This chapter describes the environmental setting for the projects, the existing conditions that constitute the baseline for the environmental impact analysis, and a detailed description of the characteristics and components of each project.

Pursuant to the applicant's request (which is consistent with established Appellate Court precedent¹), California Environmental Quality Act (CEQA) environmental review of SRRQ's proposed amendments to its Surface Mining and Quarrying Permit (AQP), which governs the Quarry's ongoing operations, and environmental review of the Amended Reclamation Plan are considered separate projects. For the sake of convenience and clarity, environmental review of the two projects is combined in this ~~Draft~~ Final EIR.

In addition to its current ARP and Surface Mining and Quarrying Permit, SRRQ currently operates under the terms of various other permits. These permits, and any revisions to them necessary to maintain consistency with the project, if it is approved, are noted in Table 3-1.

The SRRQ is located at 1000 Point San Pedro Road in an unincorporated area of Marin County, near Point San Pedro (Figure 3-1). SRRQ is a subsidiary of the Dutra Group; the acronym SRRQ in this report refers both to the applicant and to the physical Quarry site. The legal parcels on which SRRQ is located (Assessor's Parcel Nos. 184-010-**09**, **-15**, **-16**, -18, -19, -20, -44, -45, -47, -51, **-52**) are partly dry land and partly tideland, totaling 750 acres. The dry portion upon which mining occurs covers 272 acres (dryland parcels are shown in **BOLD** type above), and ranges from an altitude of 250 feet above mean sea level (+250' msl) to about -250' msl at the lowest point of the Main Quarry Bowl. It is bounded on the north by Point San Pedro Road, and on the south, east, and west by San Francisco Bay. The Peacock Gap Neighborhood, consisting primarily of single family homes, townhouses, and a golf course, is located immediately across Point San Pedro Road from SRRQ. The Marin Bay Park development and McNear's Beach

¹ *El Dorado County Taxpayers for Quality Growth v. County of El Dorado (Cool Cave Quarry, Inc.)*, 122 Cal.App.4th 1591 (2004).



SOURCE: California State Automobile Association; ESA

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-1
Project Location

**TABLE 3-1
CURRENT PERMIT AND APPROVAL STATUS--SAN RAFAEL ROCK QUARRY**

Permit Type	Permitting Agency	Permit Authority	Date of Permit	Revision
SURFACE MINING AND RECLAMATION				
Surface Mining and Quarrying Permit No. 72-03	Marin County	Marin County Code Title 23, Section 23.06	April 10, 1972	Proposed amendments described below.
Amended Reclamation Plan	Marin County, California Division of Mines and Geology	Surface Mining and Reclamation Act of 1975 (SMARA – PRC § 2710 et seq.; and Marin County Code Title 23, Chapter 23.06	December 6, 1982	Proposed amendments described below.
OTHER PERMITS				
Water Quality				
National Pollution Discharge Elimination System General Stormwater Permit for Industrial Activities; Waste Discharge ID # 2 211003840	Bay Area RWQCB	Federal Regulation		Current Stormwater Pollution Prevention Plan (SWPPP) prepared May 26, 2004; New SWPPP and accompany Storm Water management Plan to address issues associated with ARP04 prepared October 11, 2004.
Federal Clean Water Act Section 404 Permit	Army Corps of Engineers	Federal Clean Water Act	None	May be required for dredge and fill operations or alteration of wetlands.
Federal Clean Water Act Section 401 Water Quality Certification	Bay Area RWQCB	Federal Clean Water Act	None	May be required for any dredge and fill operations or alteration of wetlands or streamcourses.
Streambed Alteration Agreement	California Department of Fish and Game	CCR Title 14 Section 1400	None	May be required for alteration of a streamcourse.
Air Quality				
Permit(s) to Operate: Plant # 11036, Gasoline Dispensing Facility G# 6063	BAAQMD	BAAQMD Policies and Regulations	Reissued annually	Permits are reissued annually. May need to be revised to reflect proposed reclamation activities and/or proposed changes in quarry operations.
Biological				
Federal Incidental Take Permit	U.S. Fish and Wildlife Service and/or National Marine Fisheries Service	Federal Endangered Species Act	None	May be required if project would result in take of a federally-listed species.
State Incidental Take Permit	California Department of Fish and Game	California Endangered Species Act	None	May be required if project would result in take of a state-listed species.
Other				
BCDC Major Permit	S.F. Bay Conservation and Development Commission (BCDC)	McAteer-Petris Act and the San Francisco Bay Plan	None	Either project may need to obtain BCDC approval prior to undertaking any of the following activities on land within 100 feet of the line of highest tidal action or the Bay shoreline: Filling Placing solid material, building pile-supported or cantilevered structures, disposing of material or permanently mooring vessels in the Bay or in certain tributaries of the Bay. Dredging Extracting material from the Bay bottom. Shoreline Projects Nearly all work, including grading, on the land within 100 feet of the Bay shoreline. Other Projects Any filling, new construction, major remodeling, substantial change in use, and many land subdivisions in the Bay, along the shoreline, in salt ponds, duck hunting preserves or other managed wetlands adjacent to the Bay. Federal Projects In addition to carrying out its regulatory authority under state law, the federal Coastal Zone Management Act allows The BCDC has the authority to review federal projects and projects that require federal approval or are supported with federal funds.
County Grading Permit	Marin County Department of Public Works	Marin County Code Title 23, Chapter 23.08	None	Project would require a grading permit for each of four reclamation phases.
Leases & Prospecting Permits for Minerals Other Than Oil & Gas, or Lease and/or permit for use of tidal lands	California State Lands Commission	Public Trust Doctrine, Public Resources Code Section 6; CCR §2000 et seq	None	Project would result in creation of new tidelands and may also affect existing tidelands within the purview of the State Lands Commission; certain excavation activities, including cutting of the channel to the Bay, may involve extraction of mineral resources from tidelands.
Designation of California Historical Landmark or California Points of Historical Interest; or inclusion on California Register of Historical Resources or National Register of Historic Places	California Department of Parks and Recreation, Office of Historic Preservation	Various	None	Historical buildings on the Quarry site may be eligible for one or more of the designations or listings indicated.
Potable Water Service Connections	Marin Municipal Water District	District Regulations	SRRQ operations are currently served by the Marin Municipal Water District.	The Marin Municipal Water District has discretionary authority and responsibility for provision of potable water service, and service connections to new uses. No revision is anticipated.
Certified Unified Program Agency (CUPA) Permit for hazardous waste generators, Permit #60-0323	Marin County Department of Public Works, Office of Waste Management	Health and Safety Code § 25404; Marin County Code Title 7, Chapter 7.80	Hazardous Material Business Plan permit issued January 3, 2007	The CUPA permit is renewed annually in February of each year. Permit expires December 31, 2008.
User of High Explosives, Permit Number 9-CA-041-33-7B-00872	U.S. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms	27 CFR Part 55 and Title XI, Organized Crime Control Act of 1970	October 23, 2007	Permit expires February 1, 2010
Explosives Permit #004-07 (formerly #X001-05)	Marin County Sheriff's Office	H&S, Division X1	August 13, 2007	Permit is for one year, expires August 13, 2008

BAAQMD Bay Area Air Quality Management Board
CCR California Code of Regulations
CEQA California Environmental Quality Act
CFR Code of Federal Regulations
CUPA Certified Unified Program Agency

NPDES National Pollutant Discharge Elimination System
RWQCB Regional Water Quality Control Board
SMARA Surface Mining and Recovery Act of 1975
SWRCB State Water Resources Control Board
EIR Environmental Impact Report

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County Park are located adjacent to the property on its northeastern border. The Quarry is accessed by private roads that intersect with Point San Pedro Road, and regionally by U.S. 101.

For planning purposes, the site is divided into four quadrants (Figure 3-2). Hard rock quarrying of the site's Franciscan sandstone is confined to the Southeast Quadrant (SE Quadrant) and the SW Quadrant. The SE Quadrant also features a processing plant and asphalt batching plant, as well as a dock to allow shipping of quarry products by barge. SRRQ's offices and a residence on South Hill are located in the SW Quadrant. The NW Quadrant is the location of McNear Brick Company (also referred to as McNear's Brickyard in this document) and Marin Exposed Aggregate Manufacturing, which occupy these areas under lease. A substantial portion of the NW Quadrant is occupied by marshes. The NE Quadrant contains the "brick resource area" where shale and clay deposits were formerly mined for use in the brick making operation. The NE Quadrant also includes stockpiles of overburden and pond fines from the quarrying operation, and areas left in a relatively natural state.

3.1.1 Regional Setting

The Quarry property is located on the eastern side of a peninsula that ends in Point San Pedro, which divides San Pablo Bay from San Francisco Bay (Figure 3-1). At the western end of the peninsula are U.S. 101, the City of San Rafael, and the Marin County Civic Center. The interior of the peninsula is mountainous, and much of the land is within China Camp State Park. Much of the southern portion of the peninsula is within the City of San Rafael, with land uses comprised primarily of single and multi-family residences, a golf course, marinas, and marina-related commercial areas. To the south of the Quarry and the peninsula, the Bay is relatively calm and shallow; the Marin Islands National Wildlife Refuge borders the Quarry property to the south. To the east of Point San Pedro, however, the open Bay and the San Pablo Strait are deep with strong currents. Several small islands, including The Sisters, rise from these waters just off Point San Pedro.

Quarrying activities have occurred on the SRRQ property for over 100 years. The California Division of Mines and Geology has designated the property as a significant mineral resource area per California's Surface Mining and Reclamation Act (SMARA). Quarrying predates most of the other current land uses in the vicinity of property, including residential and recreational uses (Figure 3-3). Now, the area around the Quarry property is characterized by residential, open space, and recreational land uses. In 1982, when Marin County approved the Quarry's current Amended Reclamation Plan, the closest residences to the Quarry site were the homes on San Marino Drive. Since 1982, homes have been built much closer to the site (Figure 3-4). These include the homes on Marin Bay Park Court and on Heritage Drive. Though located within the metropolitan San Francisco Bay Area, the area around the Quarry property has a distinctly suburban character. The sense of place in this area is strongly influenced by the juxtaposition of upland and lowland areas with the Bay.

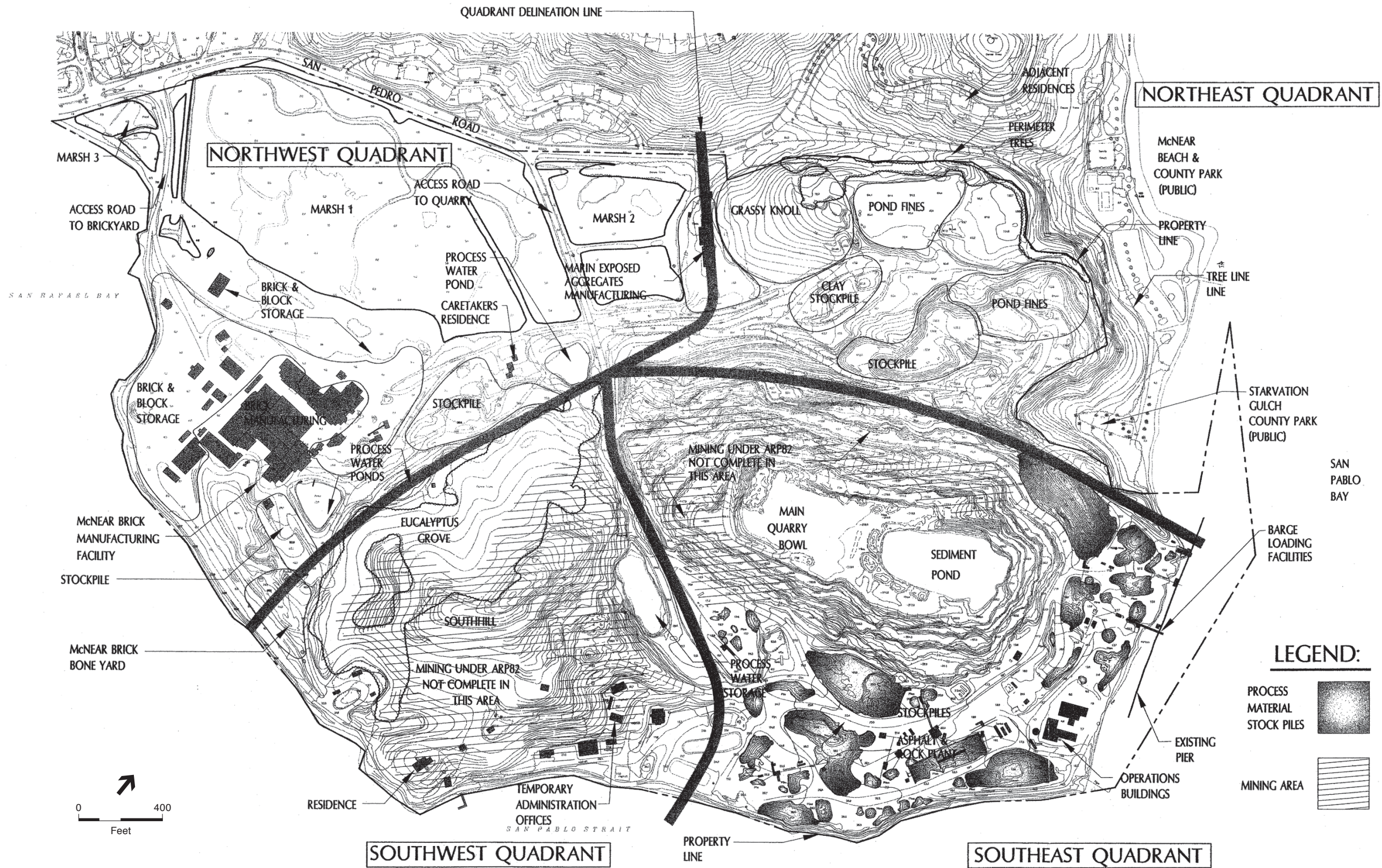
3.1.2 Local Setting

The natural topography of the Quarry property mirrors the Point San Pedro area as a whole: it ranges from sea-level marshes and Bay margins to high peaks and ridges, with natural slopes ranging from very steep to gentle. The property has an extensive waterfront. As the property has been used for over 100 years for brick making and quarrying, much of it has been transformed and now has an industrial character. This includes McNear's Brickyard, which features a number of factory and warehouse buildings of various ages; smokestacks from the brick kilns; roadways; and open storage of finished brick products and raw materials. Between McNear's Brickyard and Point San Pedro Road there is a series of saltwater and freshwater marshes, divided from one another and from the Bay by levees and roadways, including the access roads for the Quarry and the Brickyard, across Point San Pedro Road the land slopes up sharply. Single family houses along San Marino Drive, Marin Bay Park Court, and Heritage Drive overlook the Quarry property.

The SE Quadrant has been profoundly altered by quarrying; this area's most distinctive feature is the Main Quarry Bowl, which currently reaches a depth of about -250' msl. At the elevation of the operations area, the Main Quarry Bowl is approximately 1,800 feet wide from west to east, and 800 feet wide from south to north. Rainwater forms a seasonal pond in the bottom of the Main Quarry Bowl. The north side of the Main Quarry Bowl is the quarried face of the central ridge separating the SE Quadrant from the NE Quadrant. To the south and east of the Main Quarry Bowl are the Quarry's operations area and barge loading facilities, parts of which are built on Bay fill. The operations area includes crushing, sorting, and washing equipment, conveyors, materials stockpiles, process water ponds, and an asphalt batching plant. The barge loading facilities consist of a barge pier extending off of the eastern waterfront, with associated conveyors for loading docked barges.

The SW Quadrant is dominated by South Hill, on the south side of which quarrying has begun. The highest point on the property is at the summit of South Hill. Benches on the quarried slopes house the Quarry's administrative offices, a residence, and other structures. The top and northwestern slopes of South Hill have not been disturbed. The hill is crowned with a grove of large eucalyptus trees. SRRQ recently began quarrying the northeast end of South Hill.

The NE Quadrant is the area where clay and shale were formerly mined for use in the Brickyard. This mostly low-lying area is now used for stockpiling pond fines and other materials. A large berm is maintained to screen views of and noises from the Main Quarry Bowl and operations area. Relatively undisturbed areas of this quadrant include the "Grassy Knoll" and a grove of large eucalyptus trees along Point San Pedro Road. To the northeast of this area, and across the access road to McNear's Beach County Park, is the Marin Bay Park development, where single family houses are arrayed along Marin Bay Park Court. Many of these houses look directly onto the Quarry property.



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-2
Existing Conditions

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SOURCE: Pacific Aerial Surveys

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-3
Aerial View, 1946

3.2 History of the Projects

Quarrying has occurred on the site of the SRRQ since the 1870s, when the McNear family acquired the property and began operating a brickyard using the clay and shale deposits found there. Hard rock quarrying began on the site in the 1920s. In 1939, the Basalt Rock Company, Inc., acquired a lease to operate on part of the McNear property. Quarrying has occurred on the site continuously since that time. In 1971, Basalt Rock Company acquired the property from the McNear family; eventually, Basalt Rock Company became a subsidiary of the Dillingham Corporation. In 1986, San Rafael Rock Quarry, Inc. (SRRQ) acquired the Quarry property and has operated the Quarry since that date.

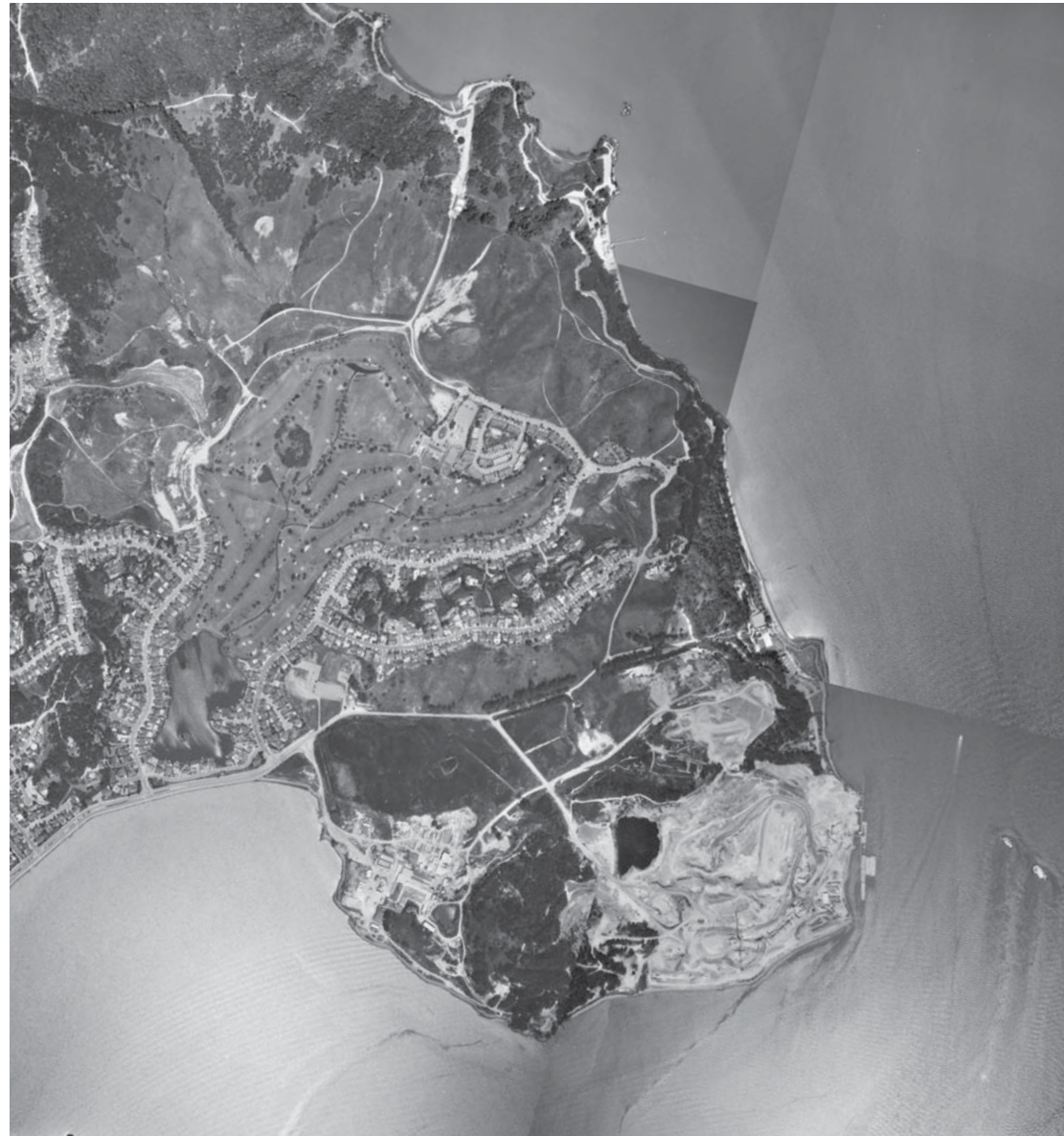
The Quarry property has been designated by the California State Department of Conservation, Division of Mines and Geology, as a deposit site for regionally significant mineral resources for the North Bay Area, and is classified under a Mineral Resource Zone, Class 2 designation (MRZ-2A), the highest category for known mineral resource deposits.

3.2.1 History of the Regulatory Process

In 1941, Marin County zoned the Quarry property M-2, A-2:B-2, Heavy Industrial, Limited Agricultural, under which quarrying was an allowed use. Marin County adopted a surface mining ordinance in 1971. In 1972, Basalt Rock Company, then the owner of the Quarry, submitted an application to the County of Marin to continue operation of the Quarry. The Marin County Planning Commission approved the application on April 10, 1972 and issued Surface Mining and Quarrying Permit #Q-72-03, thus allowing the Quarry to continue as a legal use.

The State law governing surface mining, the Surface Mining and Reclamation Act of 1975 (SMARA), took effect in 1976. SMARA required existing quarry operations to submit a reclamation plan. Basalt Rock Company submitted a reclamation plan to the County of Marin in December 1976. The County of Marin did not, however, take action to approve the 1976 Reclamation Plan.

In December, 1980, the City of San Rafael adopted the Peacock Gap Neighborhood Plan. The plan provided that the Quarry property would be developed into a mixed residential/commercial development. In 1980, Basalt Rock Company resubmitted an Amended Reclamation Plan to reflect new geologic findings. It was this plan that evolved into the 1982 Amended Reclamation Plan (ARP82). In August, 1981, Marin County amended its General Plan by incorporating the Peacock Gap Neighborhood Plan. In 1982, the County rezoned the Quarry property to RMPL (Residential/Commercial Multiple Planned District). Quarrying is not a permitted use in property zoned as RMPL. Hence, the quarrying operation became a legal nonconforming use in 1982. Also in 1982, Basalt Rock Company submitted an Amended Reclamation Plan (ARP82) to the County. The Marin County Planning Commission approved ARP82 in December, 1982, with conditions. In 1986, San Rafael Rock Quarry, Inc. (SRRQ) acquired the Quarry property and has continued to operate the Quarry since that date.



1982



2005



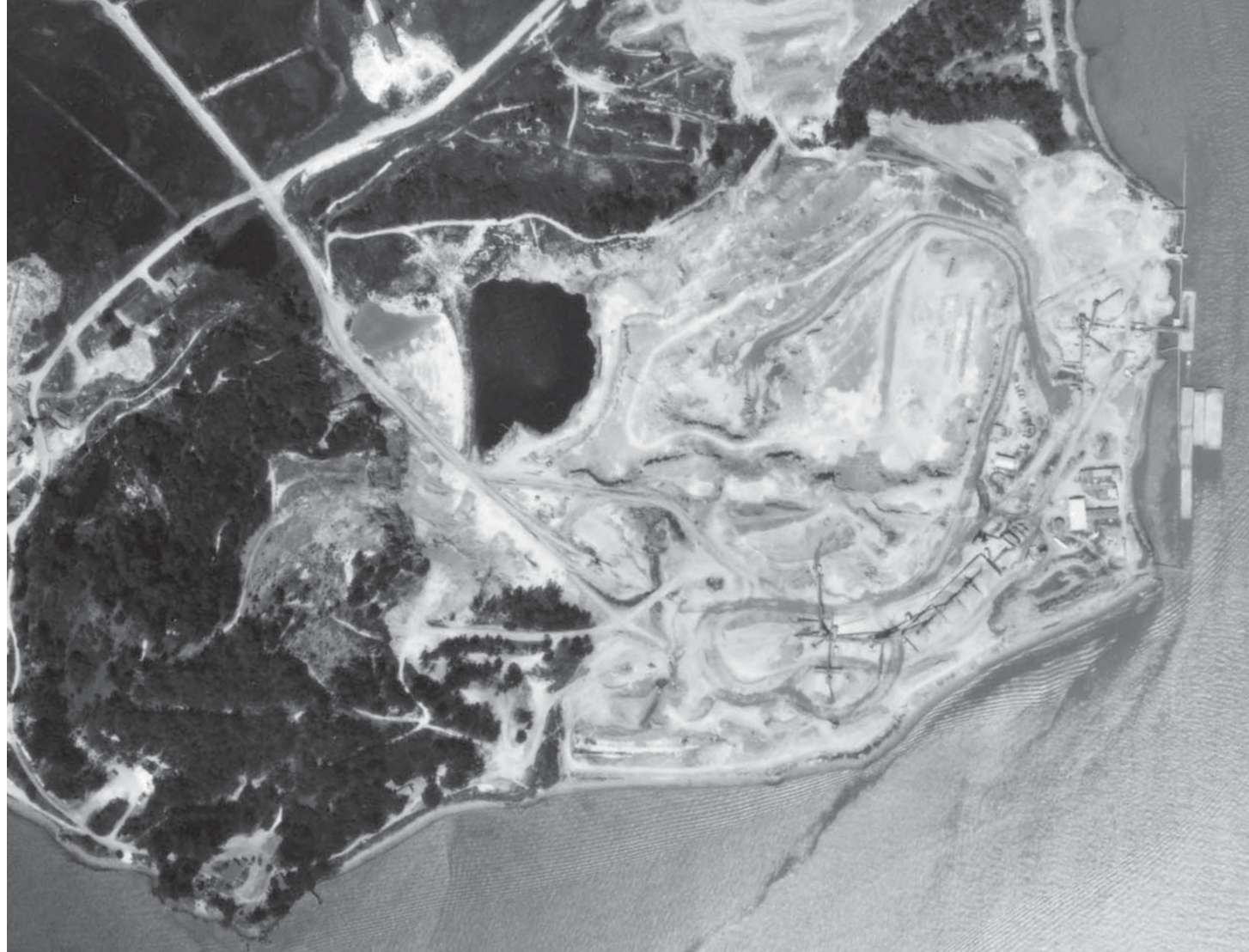


1982



2005





1982



2005



SOURCE: Pacific Aerial Surveys; GlobeXplorer

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-4c
Aerial Views, 1982 vs. 2005

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On April 11, 2000, the County issued to SRRQ a Notice of Non-Compliance due to substantial deviation from the ARP82. SRRQ subsequently submitted various reports regarding its current and planned operations; however, SRRQ did not submit an Amended Reclamation Plan. SRRQ did submit a revised financial cost estimate for reclamation of the site, which the County subjected to an independent peer review and sent to the State Office of Mine Reclamation (OMR) for review. The County approved the financial cost estimate in April 2002. In 2001, administrative actions on the Notice of Non-Compliance were put in abeyance while a global resolution regarding all reclamation and operational issues was in progress.

In September, 2001 the State of California, the County of Marin, the Point San Pedro Road Coalition, and individual neighbors of the Quarry filed lawsuits against SRRQ. The lawsuits alleged causes of action for, among other things, public nuisance, private nuisance, and violations of County zoning and building regulations. The Marin County Superior Court bifurcated the lawsuit and conducted a trial regarding the alleged zoning violations related to the alleged expansion of the non-conforming use. On April 19, 2004, the Court found and ordered that:

1. SRRQ's predecessor-in-interest had manifested an intent to quarry the mine pit to the extent that doing so was profitable without respect to depth or duration of the mine pit, and had manifested an intent to mine a portion of South Hill, as shown in ARP82;
2. Certain activities engaged in by SRRQ exceeded the scope of SRRQ's legal non-conforming right; and
3. SRRQ had substantially deviated from the ARP82.

The Court issued an order prohibiting SRRQ from taking certain actions, limiting SRRQ's operations, and encouraging the County to conduct administrative proceedings. Subsequently, the County met with SRRQ and together they agreed to conduct hearings to amend the Surface Mining and Quarrying Permit, where all operating issues associated with the mining operation could be considered. On July 15, 2004, the Court gave the agreement binding effect by ordering certain actions and, in addition, imposed Interim Operating Conditions until approval of an Amended Surface Mining and Quarrying Permit (AQP).

During the same time that the lawsuit was proceeding, the County of Marin took several regulatory actions aimed at the Quarry. On July 16, 2003, the County Department of Public Works conducted an inspection of the Quarry and determined that the operator was out of compliance with ARP82. On October 16, 2003, the County sent SRRQ a Notice of Violation (NOV) for substantial deviations from ARP82. On November 19, 2003, the County sent SRRQ an Order to Comply (OTC) with the NOV and set a hearing date for this matter before the Board of Supervisors. On January 16, 2004, SRRQ notified the County that it would not contest the OTC and waived public hearing on the matter. On April 26, 2004, one week after the Court issued its order, SRRQ submitted an Amended Reclamation Plan (ARP04). On May 25, 2004, the County notified SRRQ that its ARP application was incomplete. SRRQ requested and received several extensions for submittal of revisions to the ARP application and supporting information. On January 14, 2005, the County informed SRRQ that its ARP application was complete.

The Quarry has also been the subject of other, ongoing, independent enforcement actions. A separate enforcement case relative to the illegal expansion of administrative offices at the Quarry has recently been closed as a result of the removal by SRRQ of six of the seven office structures that were originally installed without County building permits. Another separate enforcement case on the illegal expansion and remodeling of a number of residences on the property is likely to be resolved in the near future, pending issuance of building permits.

3.2.2 Current Regulatory Requirements and Process

The primary permit related to the operation of the San Rafael Rock Quarry is the Surface Mining and Quarrying Permit, issued by Marin County pursuant to County Code Chapter 23.06 and SMARA. Preparation of a reclamation plan, and periodic amendment of this plan to ensure its consistency with current and planned operations, reclamation, and post-reclamation use of the site, is a requirement of both the County code and SMARA.

Under the State of California's Surface Mining and Reclamation Act of 1975 (SMARA), all operators of surface mines in California must prepare and submit for approval by the lead agency a reclamation plan, along with financial assurances that sufficient funds would be available to accomplish reclamation (Public Resources Code [PRC] §2770). The lead agency under SMARA is the jurisdiction with land use authority over the surface mining operation. Substantial deviations from an approved reclamation plan may not be undertaken without the submission to and approval by the lead agency of amendments to the reclamation plan (PRC §2777). Under SMARA, each lead agency must adopt a surface mining ordinance which establishes procedures for the review and approval of reclamation plans and financial assurances, and for issuance of permits to conduct surface mining operations (PRC §2774). Marin County has adopted the required ordinance and it is codified as Title 23, Chapter 23.06 of the Marin County Code.

SMARA (§2733) defines “Reclamation” as the combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding, erosion, and other adverse effects from surface mining operations, so that mined lands are reclaimed to a usable condition which is readily adaptable for alternate land uses and create no danger to public health or safety. The process may extend to affected lands surrounding mined lands, and may require backfilling, grading, resoiling, revegetation, soil compaction, stabilization, or other measures.

The following activities are considered reclamation:

- Establishment of final reclamation grades;
- Stockpiling of topsoil and other materials for future use in site reclamation, including loading and hauling of material to stockpiles for this purpose;
- Planning of post-reclamation uses of the Quarry site.

The following activities are considered operations covered by the Surface Mining and Quarrying Permit, and are not considered part of reclamation:

- The activities described and proposed in the project application;
- Removal of topsoil and overburden to expose the mineral resource for quarrying;
- Management of mining wastes and overburden unrelated to reclamation;
- Blasting and extraction of quarry products;
- Importation of San Francisco Bay sand;
- Crushing, processing, stockpiling prior to shipment offsite, loading, and shipping offsite of quarried materials, including by truck or barge;
- Operation of an asphaltic concrete batch plant;
- Operation of a truck wash system for washing quarry product transport trucks prior to leaving the facility;
- Maintenance and servicing activities at the Quarry site. “Maintenance activities” include repair, replacement, and failure preventative measures of on-site facilities, fixed plants, spring lines, vehicles, and stationary and mobile equipment related to overall, ongoing quarry activities;
- Wholesale sale of quarry products;
- Operation of the Quarry during state and local emergencies.

3.3 Environmental Baseline

The fundamental purpose of an EIR is to inform the public and decision makers of the potential effects of a proposed project on the physical environment. With an existing facility that is seeking to amend its existing permits, however, both the project, and the baseline against which impacts are to be measured, must be defined carefully to avoid confusion and to ensure that the environmental analysis properly focuses on the proposed changes that constitute the project.

3.3.1 California Environmental Quality Act Guidance on Defining the Environmental Baseline

An EIR must include a description of the “environmental setting” of a project (*CEQA Guidelines*, §15125(a)). The “environmental setting” is defined as “the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation is published.... This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (*ibid*).

3.3.2 Environmental Baseline Used in the Draft Final Environmental Impact Report

A project applicant's existing entitlement to use its property is properly considered part of the “environmental setting,” as verified by a recent California Court of Appeal decision. In *Fairview Neighbors v. County of Ventura*,² the Court held that an EIR properly considered a quarry operator's existing mining entitlement as part of the “environmental setting,” including an entitlement to generate the number of truck trips per day necessary to haul the maximum amount of material that the quarry was entitled to extract. The Court held that “the traffic generated when the mine operates at full capacity pursuant to the entitlement previously permitted” was an appropriate baseline, and rejected the petitioners' argument that the baseline should consist of the number of truck trips actually running at the time the quarry submitted its new permit application. In other words, the maximum number of truck trips allowed under the existing permit, and not the actual number then operating, was properly considered the baseline.

Consistent with the CEQA statute, *Guidelines*, and case law, and with the decisions of the Marin County Superior Court (Marin County Superior Court, 2004), the SRRQ projects that are the subject of this Draft Final EIR are defined as the scope of activities contemplated by the proposed amendments to the existing Surface Mining and Quarrying Permit and Amended Reclamation Plan, to the extent that they differ from or exceed existing permitted conditions. Existing permitted conditions include the explicit terms and conditions of the 1972 Surface Mining and Quarrying Permit and the 1982 Amended Reclamation Plan, as well as other permits that SRRQ currently holds. They also include, and are limited to, the scope of the permitted use at the time the zoning for the property changed in 1982, when quarrying became a legal, non-conforming use (Marin County Superior Court, 2004). The impacts of the proposed changes must be evaluated in relation to the existing environment at the time of the NOPs for the projects.

In summary, the impacts to be considered are those which could potentially occur due to the changes proposed in ARP04 and in the application for an Amended Surface Mining and Quarrying Permit, as described below, and as compared to existing permitted conditions. These impacts will be evaluated in relation to the existing environment at the time of the NOPs.

3.4 Project Description: Amended Reclamation Plan

This section describes the Amended Reclamation Plan. The description is based primarily on SRRQ's ARP04, plus other supporting and clarifying information received from SRRQ and accepted by the County as part of the application for approval of ARP04.

² *Fairview Neighbors v. County of Ventura*, 70 Cal. App.4th 238 (1999).

3.4.1 Existing Site Characteristics Included in the Baseline for the Amended Reclamation Plan

The site characteristics included in the baseline are described in the Regional Setting and Local Setting sections, above. In summary, the Quarry site itself has been profoundly altered by over 100 years of mining and industrial activities, but still retains areas in a relatively natural and undisturbed state. The Quarry is located in an area where the land uses are primarily residential and open-space/recreational; much of the property also fronts on San Francisco Bay. Additional detail on the characteristics of the site and its surroundings is included in each section of Chapter 4.

3.4.2 Site Uses Included in the Baseline for the Amended Reclamation Plan

The reclamation activities included in the baseline are those described in the existing Amended Reclamation Plan (ARP82), as well as existing mining conditions at the site that will require reclamation not contemplated in ARP82. These latter include the current grades of the Main Quarry Bowl, which exceed the final grades established in ARP82 (Testa Environmental Corporation, 2003), stockpiles of materials in the NE Quadrant, and the current configuration of roads, buildings, processing equipment, docks, and other infrastructure at the site (including McNear's Brickyard) as depicted in Figure 3-2.

ARP82 describes the maximum extent of quarrying, specifies the final grades of quarried slopes, discusses preparation of quarried areas for future use, and identifies areas of the property that would not be quarried or require reclamation from present conditions. ARP82 also specifies the preferred post-reclamation use of each area of the Quarry, consistent with the Peacock Gap Neighborhood Plan.³ Planned site reclamation, as contemplated in ARP82, is summarized below, and shown in Figure 3-5; planned post-reclamation uses contained in ARP82 are shown in Figure 3-6.

Amended Reclamation Plan, 1982: Reclamation of the Southeast Quadrant

1. Quarrying of the Main Quarry Bowl would continue laterally, resulting in removal of a substantial portion of the central ridge separating the SE Quadrant from the NE Quadrant (known as North Hill). The remaining part of North Hill would be about 75' above sea level, and 65' above the planned +10' msl lip of the Main Quarry Bowl. ARP82 states that at the cessation of quarrying, the northern face of the Main Quarry Bowl would be clean blasted.⁴ An 80' wide bench would be developed at elevation +10' on the northern face to accommodate a future roadway and development areas for the post-reclamation use.

³ The City of San Rafael has recently updated its General Plan (adopted November 15, 2004). There is no longer a separate Peacock Gap Neighborhood Plan. The Marin Countywide Plan Update (2007) also supersedes the 1982 Peacock Gap Neighborhood Plan. See Section 4.6, Land Use and Planning.

⁴ The Quarry equates "clean blasting" with "controlled blasting," which it defines as "the use of techniques to minimize over-break beyond designated boundaries. Several controlled blasting techniques are employed at SRRQ which include: line drilling, cushion blasting, and pre-splitting. These terms are themselves defined in the Glossary (CSW/Stuber-Stroeh, 2006a)

2. The final elevation of the Main Quarry Bowl was anticipated to be -200' msl. ARP82 includes a plan to excavate a channel to the Bay and flood the Main Quarry Bowl to create a harbor. The channel would be located at the northeast corner of the Main Quarry Bowl.
3. The post-reclamation use anticipated for the area around the Main Quarry Bowl is specified in ARP82 as the development of one 46-acre, horseshoe-shaped area for waterfront commercial, restaurant, residential, and recreational uses. Road access would be from the NW Quadrant.

Amended Reclamation Plan, 1982: Reclamation of the Northeast Quadrant

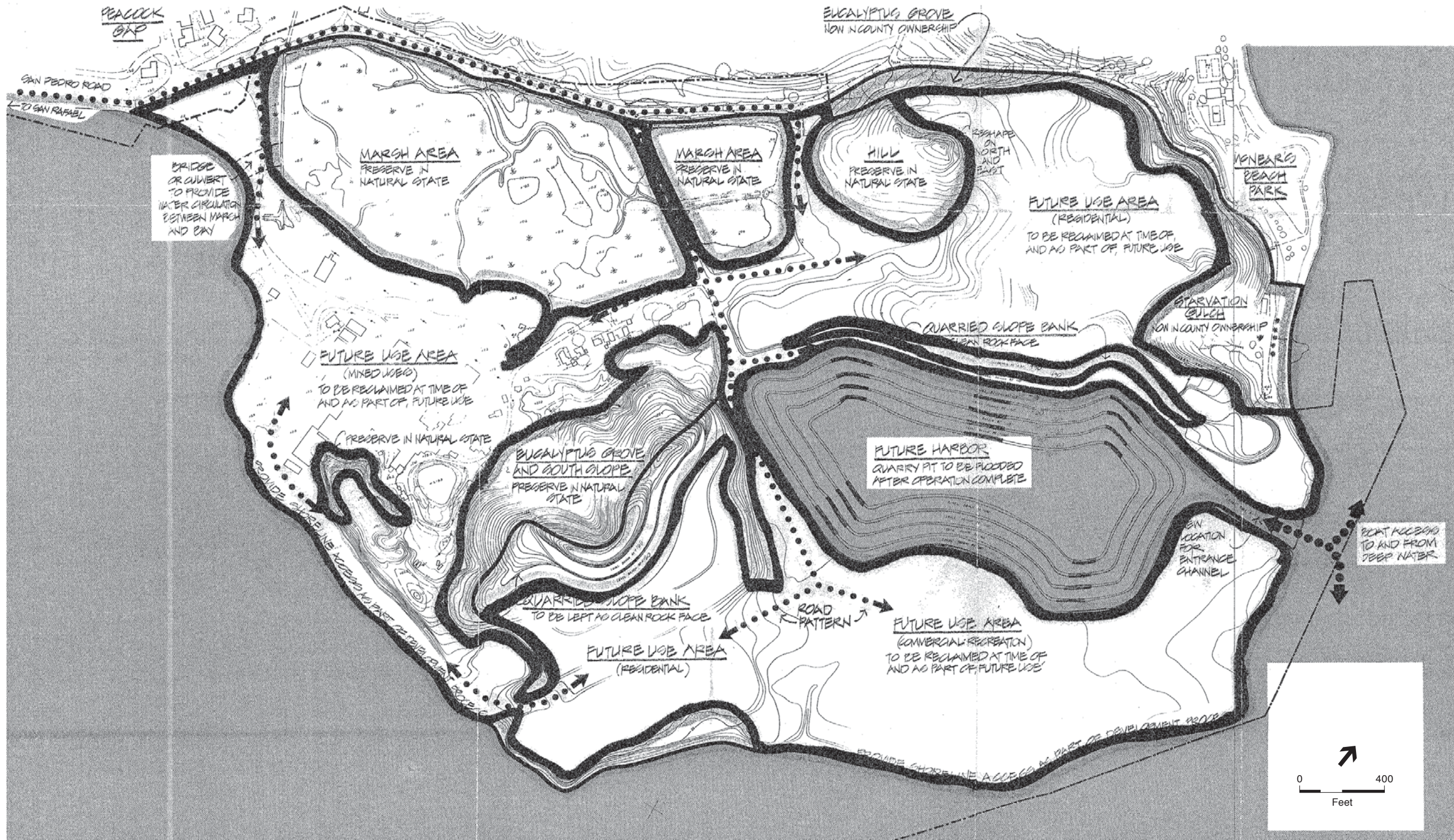
1. The ridgeline to the north of the Main Quarry Bowl would be lowered and graded for future residential use. Terraces would be developed on the north slope at about elevation +100' msl, +75' msl, and +30' msl, and +10' msl.
2. Following completion of mining of shale and clay from the NE Quadrant, the quarried areas would be prepared for post-reclamation use, presumably through contouring and re-soiling.
3. The post-reclamation use specified for this area was residential development, probably single-family homes.
4. The Grassy Knoll in the northwest corner of the NE Quadrant would be preserved in a natural state; areas that had already been affected by shale and clay mining would be re-contoured.

Amended Reclamation Plan, 1982: Reclamation of the Southwest Quadrant

1. ARP82 states that a portion of South Hill would be left undisturbed, to protect the visual character of the area and the eucalyptus grove on the hill's north side. ARP82 specified quarrying of the south side of South Hill beginning at a point 50' above the base of the trees in the eucalyptus grove, and proceeding downward in 45' lifts separated by 60' wide benches. Rock faces would be clean-blasted as preparation for post-reclamation use of the site.
2. The area from the base of the quarried slope to the Bay would be stepped as a series of development planes, in preparation for the proposed post-reclamation use of this area for residential development. ARP82 anticipated development of "Bay-oriented townhouse units" in this area.

Amended Reclamation Plan, 1982: Reclamation of the Northwest Quadrant

1. The existing marsh areas in the NW Quadrant were to be preserved in a natural state under ARP82.
2. Tidal circulation in the marshes was to be restored by placing a bridge or culvert in the access road to McNear's Brickyard at the time of reclamation.
3. Following reclamation of the NW Quadrant, this area would be developed as neighborhood-scale office or commercial uses.



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-5
ARP 82 Reclamation

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SOURCE: San Rafael Rock Quarry; Field of Vision

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-6
Planned Post-Reclamation Land Uses
ARP82

3.4.3 1982 Limitations on Operations, Conditions of Approval, and Mitigation Measures

At the time of the adoption of ARP82, Marin County imposed certain conditions on the Quarry's operations in order to reduce impacts of continued operations on the Quarry's neighbors. While current standards for implementation of SMARA call for a clear division between mining operations and reclamation plans, this distinction was not clearly drawn in 1982. Operating conditions that were made part of the County's approval of ARP82 include items 4-6 below. Conditions that relate to reclamation include items 1, 2, and 3 below⁵:

Conditions on Reclamation

1. The Quarry shall annually provide a topographic map and accompanying report to the Department of Public Works for monitoring conformance with the proposed Reclamation Plan;
2. Three years prior to completion of quarrying operations, specific cleanup measures to be undertaken prior to completion of mining are to be defined by the Quarry, the County, and City of San Rafael staff. Measures shall include a detailed landscape plan, with procedures and specifications for revegetation of selected areas, submitted to the County Department of Public Works;
3. The reclamation plan does not constitute the Master Plan of Development for the site. It indicates general land uses and includes intention to provide shoreline access when development occurs. Conformance with BCDC (Bay Conservation and Development Commission) will be accomplished when quarrying is exhausted and development of the site is proposed. The Master Plan for Development shall fully conform with all applicable BCDC plans and policies.

Conditions on Operations

4. The Quarry's operator must provide a line-of-site visual and noise buffer between the processing plant and homes on San Marino Drive by:
 - a. Retaining the material stockpiles in their existing location to shield plant structures from nearby residences;⁶
 - b. Maintaining a 15-foot high lip between the Main Quarry Bowl and homes on San Marino Drive;
5. The Quarry shall shield lights in the plant to minimize glare at adjacent home sites;
6. The Quarry must use barge transport to accommodate shipment of any increases in rock above 1982 volumes and tonnages. Should barge operations be terminated, a traffic study by a qualified engineer shall be required to assess potential impacts and develop mitigations prior to transporting by roads.

⁵ SRRQ is now proposing to remove those operating conditions and mitigation measures related to operations from the ARP and add them to their proposed Amended Quarrying Permit.

⁶ Note that neither the Marin Bay Park development nor the development on Heritage Drive had been built in 1982.

3.4.4 2004 Amended Reclamation Plan Project Objectives

The primary objective for the project is to amend the existing Amended Reclamation Plan to comply with SMARA and County regulations. Other objectives for the project have been enumerated by the applicant (see Appendix H) and are summarized as follows:

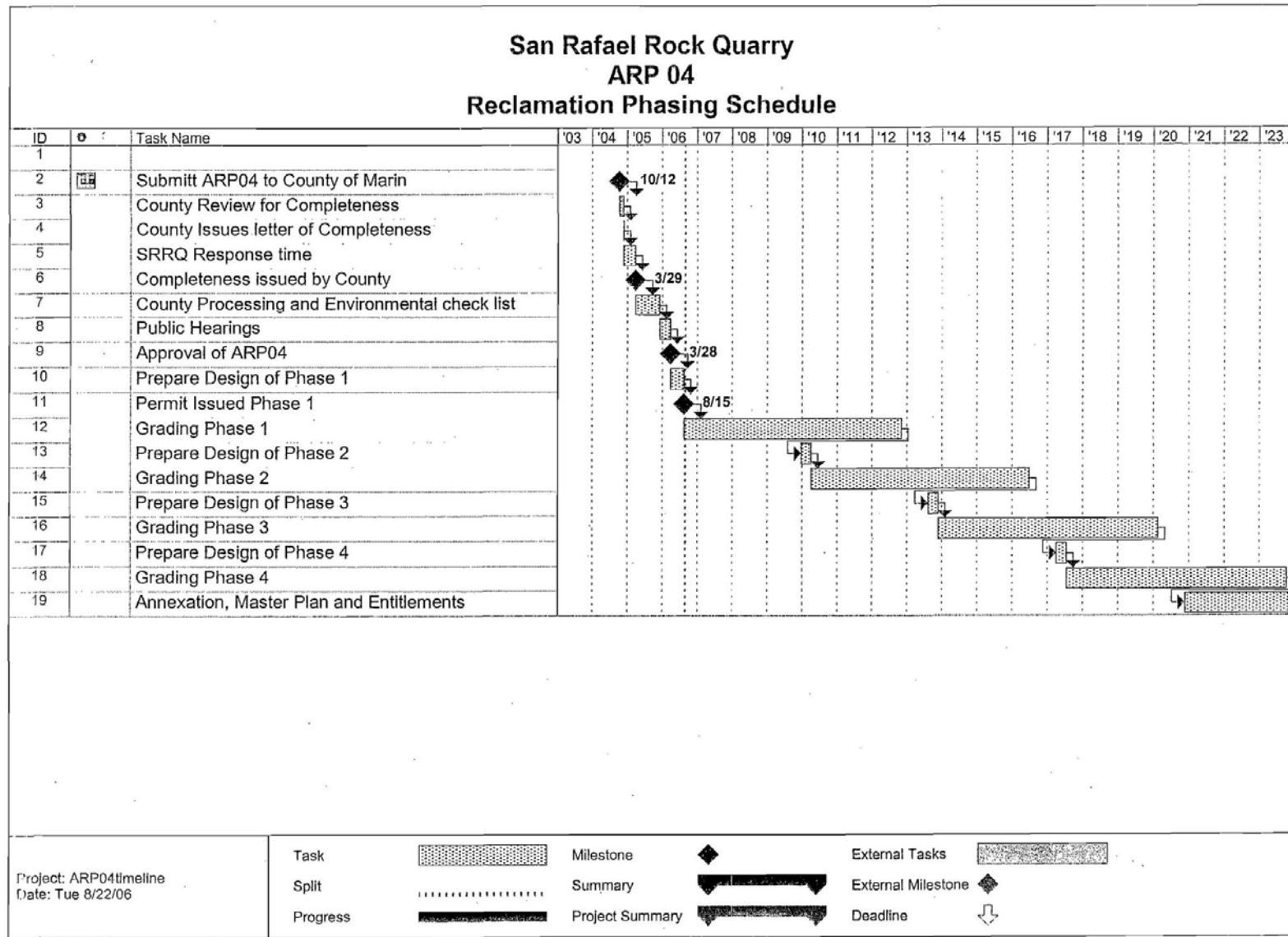
- Adopt an amended reclamation plan that is consistent with the current requirements of SMARA and that has been subjected to current environmental review requirements of CEQA;
- Adopt an amended reclamation plan that reflects SRRQ's intent to mine to a greater depth (average depth of the Main Quarry Bowl -350 feet msl; maximum depth -400 feet msl) and for a longer period of time (through approximately 2024) than stated in the previous amended reclamation plan;
- Update technical information regarding Quarry ownership, legal, and regulatory status;
- Adopt a phased reclamation schedule in order to begin certain reclamation activities as mining on the site proceeds. Achieve site preparation for reclamation without importation of additional fill;
- Update and confirm the post-reclamation uses already planned in the prior amended reclamation plan; and
- Transfer prior approved ARP82 conditions that are relevant to the Quarry operations, to the currently proposed Amended Quarry Permit activities.

3.4.5 Amended Reclamation Plan Project Elements and Characteristics

The applicant's submittal for ARP04 describes “only two substantive changes” to ARP82 that are being requested as a part of the approval of ARP04: (a) increasing the depth of the Main Quarry Bowl; and (b) increasing the duration of mining. A review of all materials provided by the applicant and comparison to ARP82, however, indicates that ARP04 is a much broader project. Some of the project elements represent completely new aspects of planned site reclamation, while others are changes to elements of ARP82. The project elements may be summarized as follows:

1. As stated in ARP04, the applicant now proposes to carry out reclamation in four phases. Reclamation would therefore mainly occur during the remaining operational life of the Quarry, instead of at the end of quarrying activities, as contemplated in ARP82. Some reclamation activities would occur after the end of mining operations. The phases would occur approximately as follows: Phase 1: years 0 to 6; Phase 2, years 4 to 10; Phase 3, years 8 to 14; Phase 4, years 11 to 17 (see Table 3-2, below).

TABLE 3-2



2. The applicant now proposes to excavate the Main Quarry Bowl to an average bottom depth of -350' msl⁷ and a maximum depth of -400' msl, and to extend the Main Quarry Bowl to a greater lateral extent than described in ARP82. Upon reclamation and flooding of the Main Quarry Bowl, this will result in a larger, deeper harbor. The applicant also proposes to construct the connecting channel to a greater depth than specified in ARP82.
3. The applicant proposes to mix pond fines with overburden in the NE Quadrant to produce material for engineered fills for reclamation purposes. Consistent with SMARA §2730, pond fines are considered mining waste.
4. The applicant now proposes to construct a berm approximately 70 feet above existing grade, 300 feet wide by 600 feet long, along the northern property line in the NE Quadrant during Phase 1, to provide a visual and sound screen for the neighbors to the north of the property. The berm will be maintained until the completion of other reclamation activities in the NE Quadrant, and then will be removed.
5. To prepare for future development in the NW Quadrant, the applicant proposes to construct a surcharge berm, approximately 15 feet above existing grade and covering 5.9 acres, in a portion of the area presently occupied by McNear's Brickyard. The purpose of the surcharge berm is to consolidate the underlying Bay Mud to increase its geotechnical strength to serve as a foundation for future development of the site.
6. The applicant proposes to construct jetties on either side of the channel that will be constructed to connect the Main Quarry Bowl to the Bay. The purpose of the jetties will be to protect the channel from siltation. Jetties were discussed briefly in ARP82, but ARP04 adds detail to this project element.
7. The applicant proposes alteration of the final contours of the south side of South Hill
8. The applicant proposes removal of most of the structures associated with McNear's Brickyard, though some of the structures, such as the brick kiln and its associated stacks, may be retained.
9. The applicant proposes stockpiling of topsoil in the NW Quadrant.
10. The applicant proposes to extend the time for completion of quarrying at the site for 15-17 years after approval of the Amended Reclamation Plan. Assuming that the plan would be approved sometime in 2008, quarrying would continue until some time between 2023 and 2025. Development plans would be submitted three years prior to the end of quarrying.
11. The applicant proposes several standards for engineered fills and slopes.
12. The applicant proposes several standards for site revegetation.
13. The applicant proposes to establish setbacks from sensitive areas and areas to be preserved in a natural state.
14. The applicant proposes adding a ferry landing at the location of the present barge loading pier as a post-reclamation site use.

Below, additional detail is provided for each of these project elements.

⁷ Both ARP82 and ARP04 use a common datum, i.e., NGVD-29.

Amended Reclamation Plan Project Element 1: Phased Reclamation

ARP04 provides details on the timing of reclamation, and the specific grading, erosion control, and revegetation activities not included in ARP82. In ARP04, SRRQ has divided reclamation work into four phases that would occur over the remaining operational life of the Quarry. Thus, at the cessation of quarrying, a substantial portion of the site reclamation would already have occurred.

The four phases would occur sequentially, but with overlap. Each phase is anticipated to have a duration of 3-7 years (Table 3-2). The applicant anticipates that each reclamation phase would be subject to individual permits covering, as necessary, grading, erosion control, stormwater pollution prevention, and biological resources.

Some of the permits specific to each phase may require additional environmental review under CEQA, after details of the activities slated for the phase have been laid out. This document examines reclamation phasing at a programmatic level of detail, commensurate with the detail provided in ARP04. This document may be used as a basis for tiering of additional CEQA review of the permits for each reclamation phase, as contemplated by §15152 of the CEQA *Guidelines*.

Grading activities associated with phased reclamation would in total require the relocation of over 2 million cubic yards of material. SRRQ proposes to limit disturbance of neighbors by conducting reclamation grading activities only during an 8-10 week period during the dry season of each year. Planned reclamation grading activities for each phase are described below, along with associated hydrology, erosion control, and revegetation activities. Table 3-3 summarizes the reclamation grading activities that would take place in each phase, and provides the estimated amount of material that would be excavated or filled for each discrete activity. The areas that would be mined, reclaimed, and preserved are depicted in Figure 3-7. The intended post-reclamation uses of the property are not themselves considered reclamation, but must be taken into consideration, since the site must be reclaimed to accommodate the intended future use. Post-reclamation use of the property is discussed below and depicted in Figure 3-8.

Reclamation activities are slated for the NW, SW, and NE Quadrants in each of the four phases. Reclamation would not occur within the SE Quadrant until the cessation of quarrying in the Main Quarry Bowl, which is expected to occur during Phase 4.

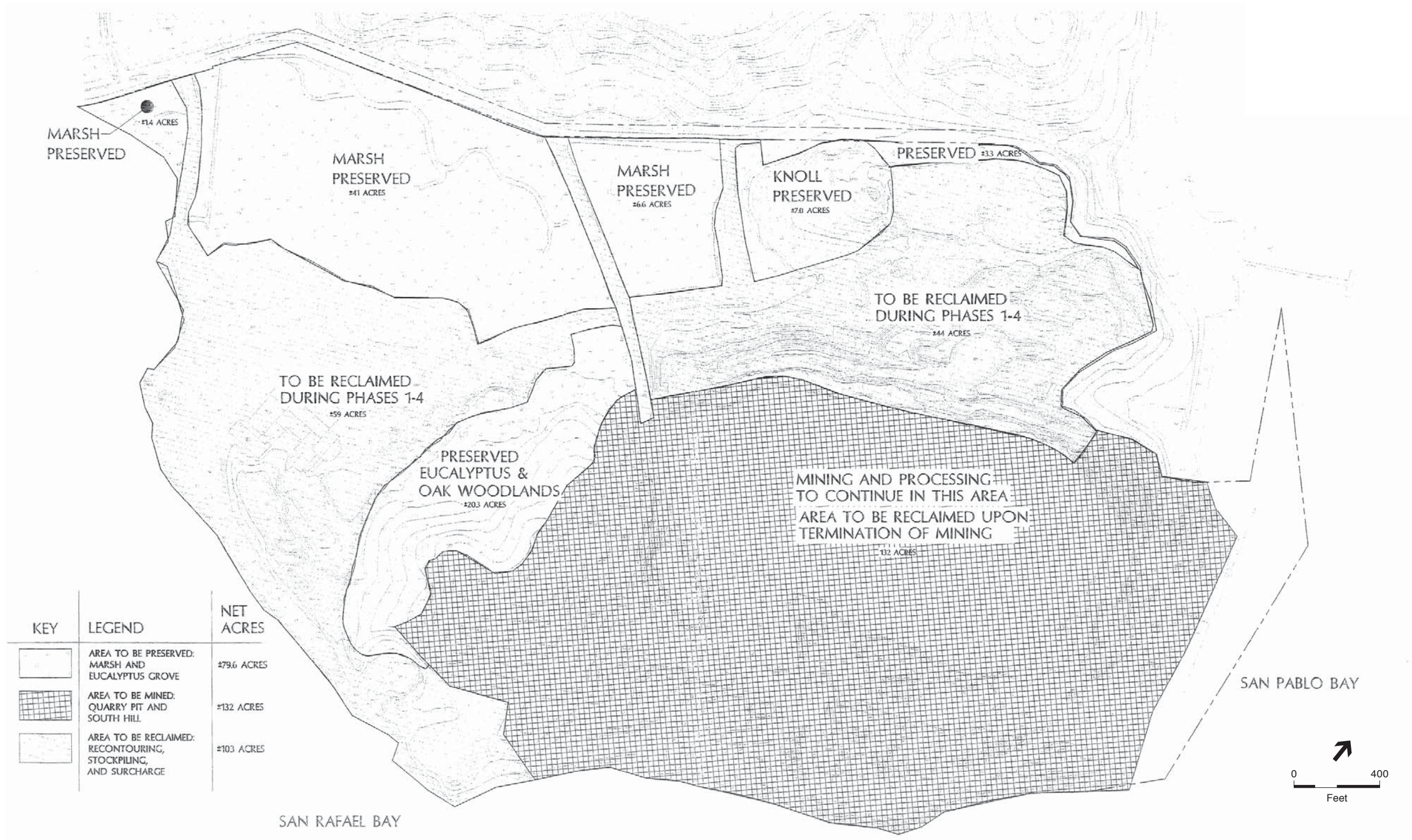
Phase 1 Reclamation (Years 1-7 following Amended Reclamation Plan Approval)

Phase 1 Grading

Planned Phase 1 reclamation grading activities are shown in Figure 3-9. Refer also to Table 3-3 for the anticipated volume of cut and fill material associated with each activity.

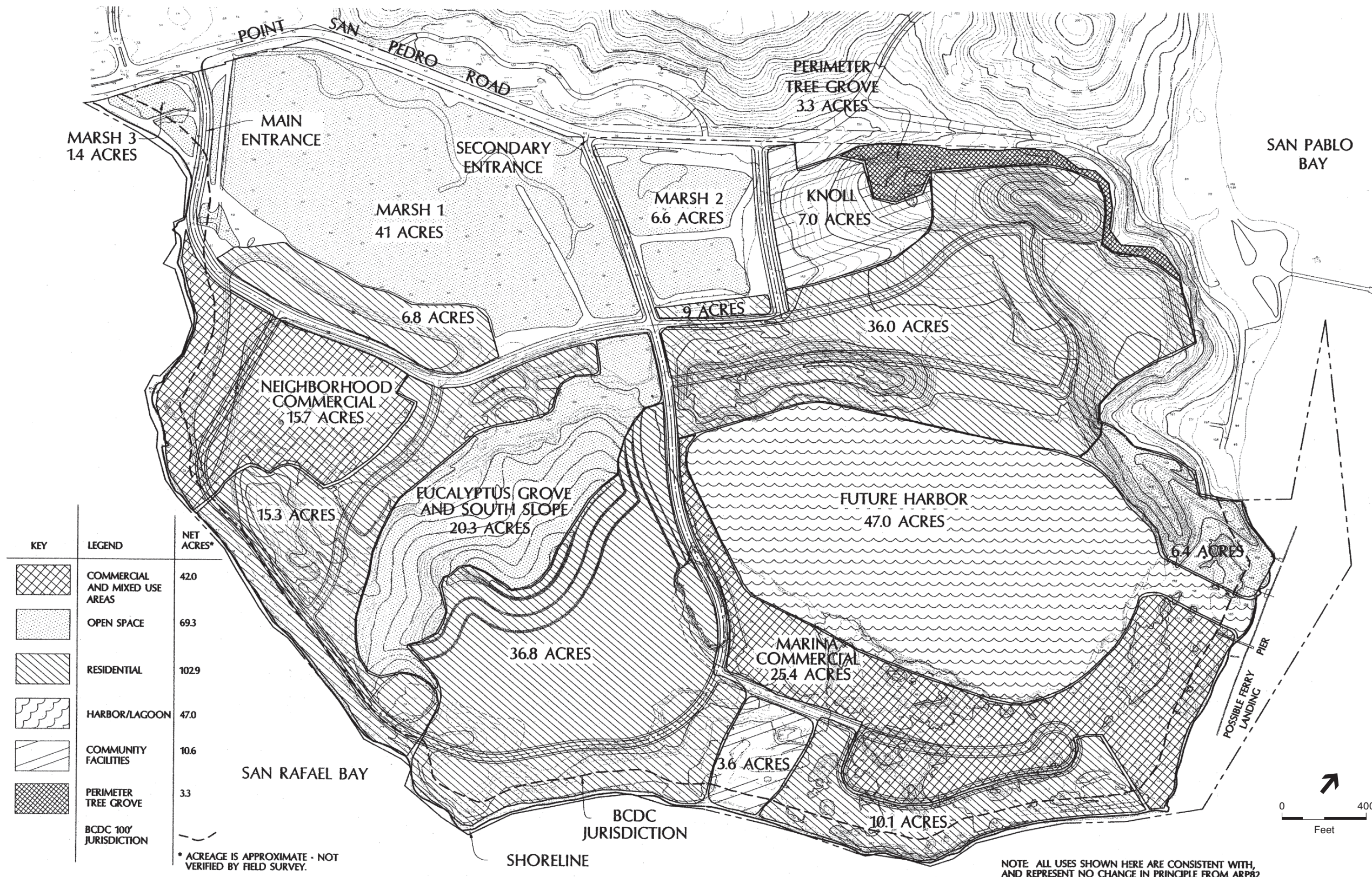
Northwest Quadrant

1. Create a topsoil stockpile using 14,500 cubic yards of material from SW Quadrant area SW-1 (~~see section 3.6.10, below~~).



SOURCE: San Rafael Rock Quarry

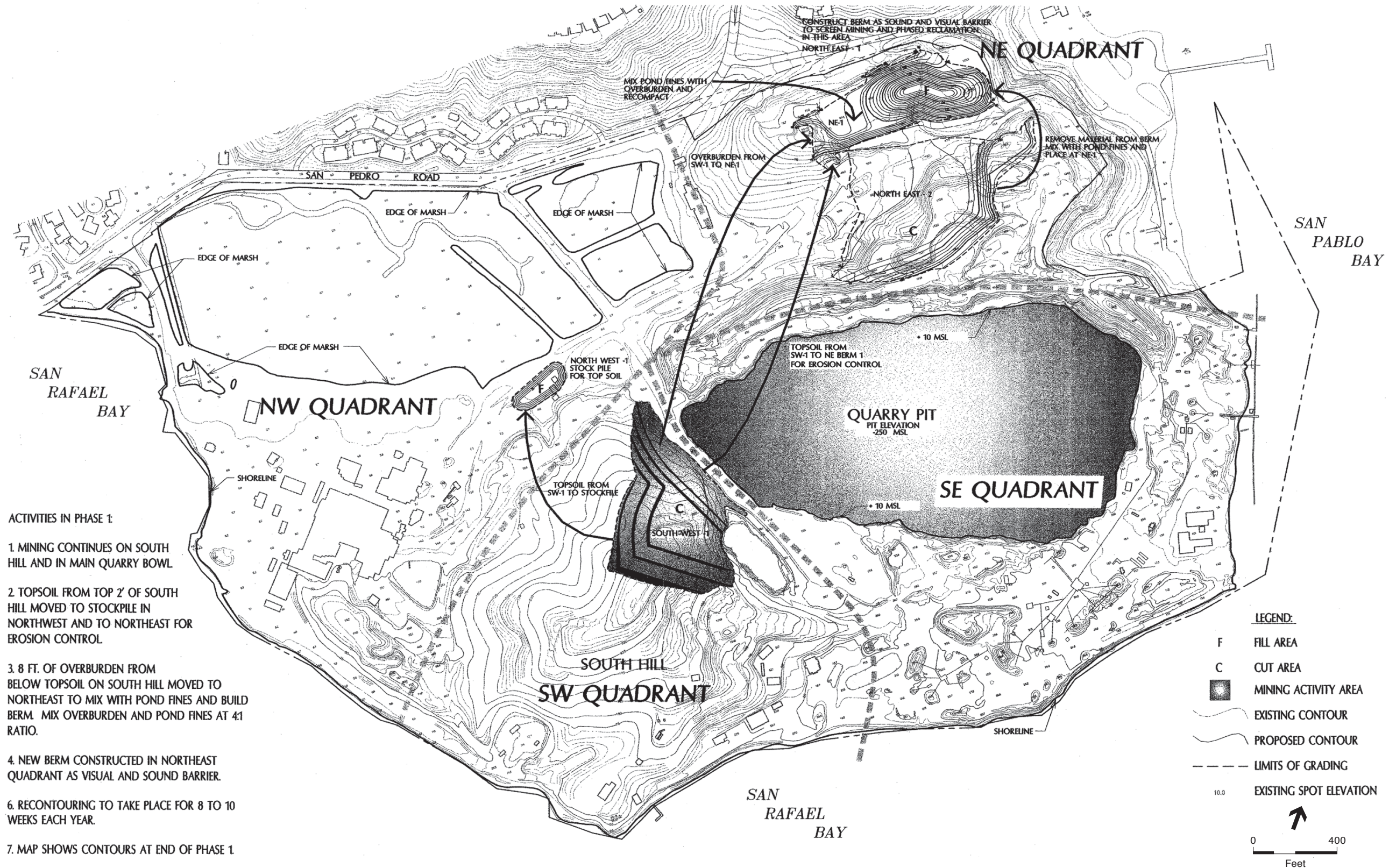
San Rafael Rock Quarry ARP and AQP EIR . 205145
Figure 3-7
 Activity Areas During Phases 1 through 4



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-8
Future Land Uses



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-9
Phase 1
Grading

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**TABLE 3-3
SUMMARY OF GRADING ACTIVITIES, CUT AND FILL VOLUMES
(all figures are cubic yards)**

Quadrant	Work Description	Cut	Fill	Comments
Phase 1				
NW	Topsoil stockpile		14,500	
SW	Remove overburden from area SW-1	58,800		
	Remove topsoil from area SW-1	19,600		
NE	Mix South Hill overburden material with pond fines and re-grade area NE-1		58,800	
	Remove pond fines to mix	62,100		
	Remove pond fines to stockpile	86,800		
	Erosion control		5,100	
	Build new berm with pond fines and overburden material from existing berm		171,700	
	Stockpile pond fines on back of berm		86,800	
	Mixed material to begin new grade		80,000	
	Remove from existing berm to mix with pond fines	189,600		
Total Phase 1		416,900	416,900	
Phase 2				
NW	Topsoil stockpile		7,500	
	Surcharge berm		218,100	
SW	Remove topsoil from SW-2	29,300		
	Remove overburden from SW-2 for mix with pond fines and existing berm material	87,800		
NE	Existing berm material for mix with pond fines and overburden	247,500		
	Pond fines for mix with existing berm material and overburden	83,800		
	1' topsoil to cover pond fine berm		15,800	
	Amend topsoil for Area NE-1 and revegetate		6,000	
	Re-grade area NE-2 to final grade		201,000	
Total Phase 2		448,400	448,400	
Phase 3				
NW	Create topsoil stockpile (from SW Quadrant		12,800	
	Move and re-contour surcharge material to final grades	218,100	218,100	Figure represents total amount of material needed for the surcharge berm; construction of berm may be spread out over phases 2, 3, and 4.
SW	Remove 2' topsoil from SW-3	24,900		
	Remove 8' overburden from SW-3	74,800		
	Create stockpile from overburden material plus 18,700 cy of pond fines stockpiled in NE Quadrant		93,500	

TABLE 3-3 (continued)
SUMMARY OF GRADING ACTIVITIES, CUT AND FILL VOLUMES
(all figures are cubic yards)

Quadrant	Work Description	Cut	Fill	Comments
Phase 3 (cont.)				
	Re-soil SW-2 benches from topsoil stockpile		???	
NE	Remove pond fines from stockpile to SW Quadrant to mix with overburden	18,700		
	Remove remaining pond fines stockpile to meet final grade; mix with material from existing berm, use for re-grading	46,600		
	Re-grade portion of NE Quadrant		233,000	
	Place topsoil in NE-2 and revegetate		12,100	
	Remove material from existing berm, mix with pond fines, for re-grading of portion of NE Quadrant	186,400		
Total Phase 3		569,500	569,500	
Phase 4				
NW	Demolish McNear's Brickyard buildings			
	Place fill to raise McNear site		199,500	
	Remove topsoil stockpiles	34,800		
		218,100		Timing and volume of surcharge removal dependent on geotechnical conditions achieved
	Remove surcharge berm			
	Lower hill behind brick manufacturing facility to +50' msl	291,100		
SW	Place fill mix over Quarry plane		440,000	
	Place topsoil in re-soil areas		???	
			191,200	Consists of unspecified quarry products; volume is a preliminary estimate.
	Material to go offsite for levee repairs			
NE	Remove remaining West end of berm just to the north of North Hill and berm at NE-1 and re-grade north side of Main Quarry Bowl	300,000		
	Remove pond fines stockpile	21,500		
	Place pond fines in bottom of pit		???	
	Re-soil areas at finished grade		20,000	
SE	Complete mining of Main Quarry Bowl - to elevation -350 msl			
	Remove crushing and asphalt plants			
	Place topsoil		14,800	
	Re-grade south side of Quarry excavate connection to the Bay (optional)	???		
Total Phase 4		865,500	865,500	
GRAND TOTAL—All Phases		2,300,300	2,300,300	

Key: ??? – volume unspecified;

- Remove 58,000 cubic yards of overburden (eight feet of depth) from the SW mining area (SW-1) and transport it to the NE Quadrant for use in the new berm (~~see section 3.6.1, above~~).

Northeast Quadrant

Five major grading activities are planned for the NE Quadrant during Phase I.

- Re-grade the area designated “NE-1” with engineered fill consisting of pond fines, overburden material from the SW Quadrant, and material from the existing berm further to the south. NE-1 is currently occupied partially by a stockpile of pond fines (148,900 cubic yards of material), all of which would be removed and some of which would be used in the re-grading of NE-1 and in the construction of a new berm in the NE Quadrant (see 2, below). Re-grading this area would use 58,000 cubic yards of overburden removed from the SW Quadrant, plus 80,000 cubic yards of mixed material consisting of pond fines and material excavated from the existing berm just to the north of North Hill. The fill in this area would be engineered for compaction, and would have permanent side slopes of two feet horizontal to one foot vertical (2H:1V), with benches at 30 feet.
- Construct a new berm within NE-1 to provide visual and sound screening from reclamation activities in the NE Quadrant for neighbors to the North, particularly on Marin Bay Park Court (~~see section 3.6.1, above~~). The berm would involve fill of 171,700 cubic yards of mixed pond fines and material excavated from the existing berm located just to the north of North Hill. The new berm would be 75 feet above grade, with 2:1 slopes and would not require benches. The northerly face would be hydroseeded and landscaped to soften its appearance. The existing grove of trees on the northern perimeter of the property, along Cantera Way, would be maintained.
- Stockpile the remaining pond fines not used in 1 or 2 (86,800 cubic yards of pond fines) on the south side of the temporary berm in area NE-1.
- Excavate a portion of the existing berm located just to the north of North Hill (189,600 cubic yards of material) for use in 1 and 2 above. The westerly portion of the existing berm would be retained through Phase 3 of the reclamation, to continue to provide a noise and visual barrier for residents on Point San Pedro Road and San Marino Drive.
- Use of 5,100 cubic yards of topsoil from the SW Quadrant for erosion control on re-graded areas of the NE Quadrant.

Southeast Quadrant

No reclamation activities are planned for the SE Quadrant in Phase 1

In all, Phase 1 re-grading would involve cut and fill of 419,600 cubic yards of material, with a net zero materials balance.

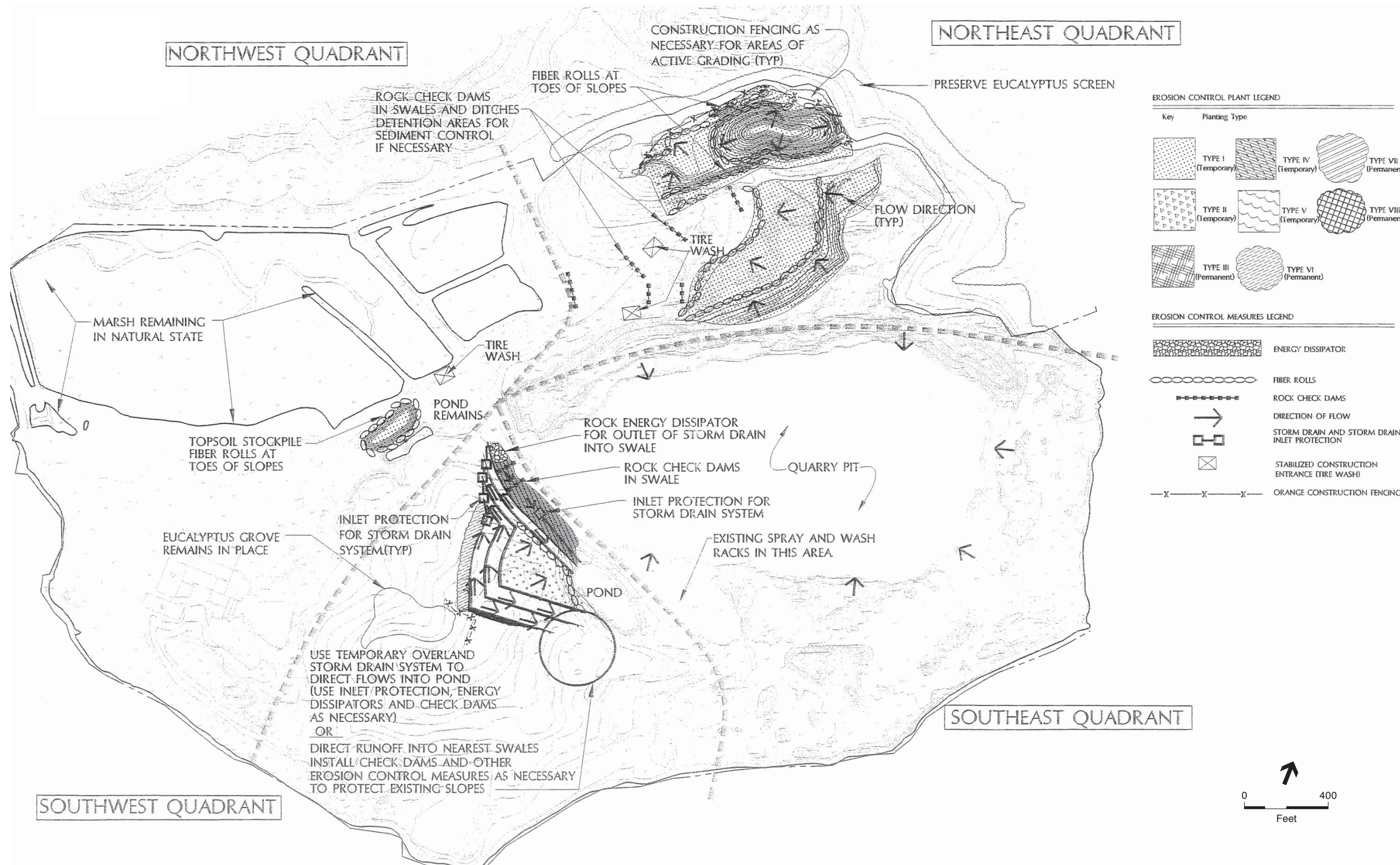
Phase 1 – Hydrology, Erosion Control, and Revegetation

Planned management of site hydrology, erosion control, and revegetation for Phase 1 reclamation are shown in Figure 3-10. Planned revegetation activities are summarized in Table 3-4. Erosion control and revegetation would be consistent with proposed design and construction standards (~~see Sections 3.6.12 and 3.6.13, below~~).

**TABLE 3-4
PLANNED REVEGETATION IN EACH RECLAMATION PHASE**

Quadrant	Phase 1	Phase 2	Phase 3	Phase 4
Northwest	Type V planting on stockpiled materials	Type I revegetation of slopes of surcharge berm; use of fiber rolls to prevent silt from entering marsh	Type V revegetation of surcharge stockpiles	
Southwest	Permanent Type VI vegetation on Quarry Bowl at the top of South Hill in the area where overburden and topsoil are removed, to provide visual and habitat enhancement	Continue permanent Type VI revegetation of South Hill along the lip of the Quarry face. Apply 12" of topsoil to future development planes to enable establishment of erosion control plant material. Type IV revegetation of swale areas	Place 12" of topsoil and revegetate using Plant Type VI the lip of the Quarry area	
Northeast	Type I vegetation on disturbed temporary slopes; addition of 12' topsoil on areas to be planted	Placement of 12" of topsoil and revegetation using Type I and Type II plant material on graded areas and slopes	Areas brought to final grade would be revegetated using Type III, VI, VII, and VIII as indicated in Figure 3-13	Type VI and III material to be installed to provide visual and habitat enhancements
Southeast	None	None	None	
All Quadrants				Type III in all unvegetated areas that would become permanent open space or remain undeveloped; Type VIII in key visual and transportation corridors Type III in annually disturbed areas; Type II in future development areas; Marsh restoration in accordance with Development Plan

Note: For description of each vegetation type, see Section 3.6.12, below.



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-10
Phase 1
Erosion Control and Revegetation

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Southwest Quadrant

1. Remove 19,600 cubic yards of topsoil in the mining area (SW-1). 14,500 cubic yards would be moved to the east end of the NW Quadrant and stockpiled, as noted above; 5,100 cubic yards would be moved to the NE Quadrant for erosion control. This would involve removal of two feet of topsoil from area SW-1.

Erosion control would be implemented annually prior to the onset of the rainy season, and in accordance with the then-current Stormwater Pollution Prevention Plan (SWPPP). Erosion control would consist of:

- Covering exposed areas with straw and tackifier;
- Use of erosion control blankets on problem slopes;
- Vegetation of slopes that would be undisturbed for more than one rainy season;
- Exposed steeper slopes (greater than 2H:1V) other than rock faces would be hydromulched and fiber rolls placed at 30-foot elevations;
- Use of rock check dams in swales and ditches downstream from exposed areas;
- Inlet protection around storm drain structures;
- Use of energy dissipaters at storm drain outlets where needed;
- Use of silt fencing or construction fencing to protect sensitive areas from grading operations;
- Designated equipment and materials storage and washdown areas in accordance with BMPs;
- Use of gravel and rock beds within roadways to clean tires.

Planned layout of these erosion control methods is shown in Figure 3-10.

Phase 2 Reclamation (Years 5-11 Following Amended Reclamation Plan Approval)

Planned Phase 2 reclamation activities are shown in Figure 3-11. Refer also to Table 3-3 for the anticipated volume of cut and fill material associated with each activity.

Phase 2 – Grading

Northwest Quadrant

1. Construct a topsoil stockpile at NW-2, using 7,500 cubic yards of topsoil from the SW Quadrant
2. Construct a surcharge berm at NW-3 using 218,100 cubic yards of mixed material from the NE Quadrant. This will require the demolition of some, but not all, of the existing McNear's Brickyard buildings, and will affect areas currently used for storage of materials and inventory.

Southwest Quadrant

1. Remove the top two feet of topsoil from South Hill area SW-2 (29,300 cubic yards of material) and stockpile in NW Quadrant or use in NE Quadrant for erosion control.
2. Remove eight feet of overburden from South Hill area SW-2 (87,800 cubic yards of material), move to NE Quadrant.

Northeast Quadrant

1. Mix overburden material from SW Quadrant and material excavated from the existing berm just to the north of North Hill (247,500 cubic yards) with 83,300 cubic yards of pond fines stockpiled in the NE Quadrant in Phase 1 (mix is at a ratio of four parts overburden to one part pond fines) and use the material to build-up area NE-1 to final grades and compaction. Build-up of NE-1 would require 201,000 cubic yards of material.
2. Move 218,100 cubic yards of excess mixed overburden material, berm material, and pond fines to NW Quadrant for use in the surcharge berm.

Southeast Quadrant

No reclamation activities are planned for the SE Quadrant in Phase 2. During Phase 2, the Main Quarry Bowl would be deepened to an elevation of approximately -250' msl.

In all, Phase 2 re-grading would involve cut and fill of 448,000 cubic yards of material, with a net zero materials balance.

Note that some overburden material from the SW Quadrant would be moved twice – once to be mixed with pond fines in the NE Quadrant and again to the NW Quadrant for use in the surcharge berm.

Phase 2 – Hydrology, Erosion Control, and Revegetation

Planned management of site hydrology, erosion control, and revegetation for Phase 2 reclamation is shown in Figure 3-12; planned revegetation activities are summarized in Table 3-4. Erosion control and revegetation are consistent with proposed design and construction standards (see Sections 3.6.12 and 3.6.13, below), and similar to those specified for Phase 1 Reclamation.

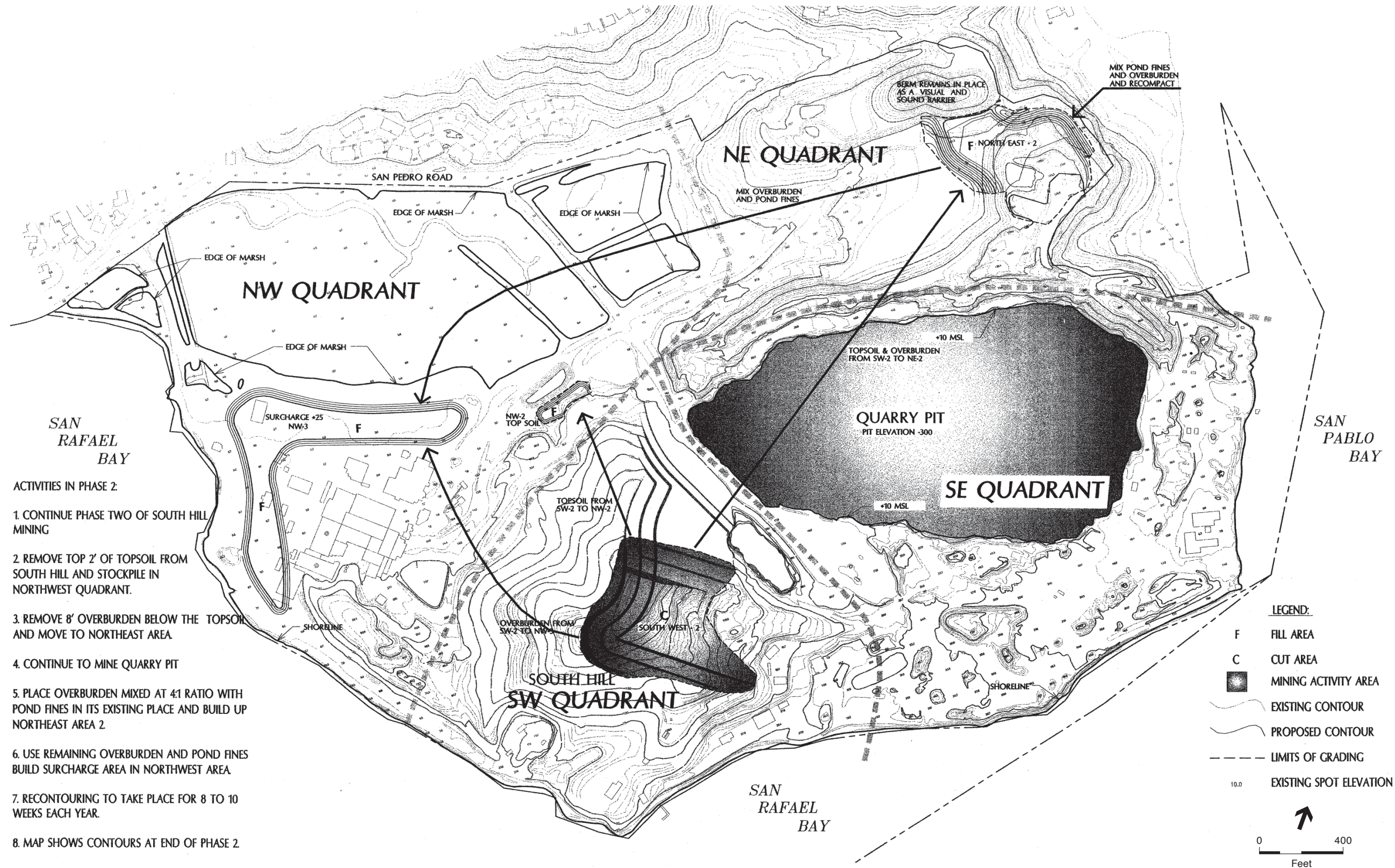
Phase 3 Reclamation (Years 8-15 Following Amended Reclamation Plan Approval)

Phase 3 – Grading

Planned Phase 3 reclamation activities are shown in Figure 3-13. Refer also to Table 3-3 for the anticipated volume of cut and fill material associated with each activity.

Northwest Quadrant

1. Create topsoil stockpile using 12,800 cubic yards of material from the SW Quadrant (see section 3.6.10, below).
2. Re-contour and compact surcharge berm to achieve final grades and compaction.



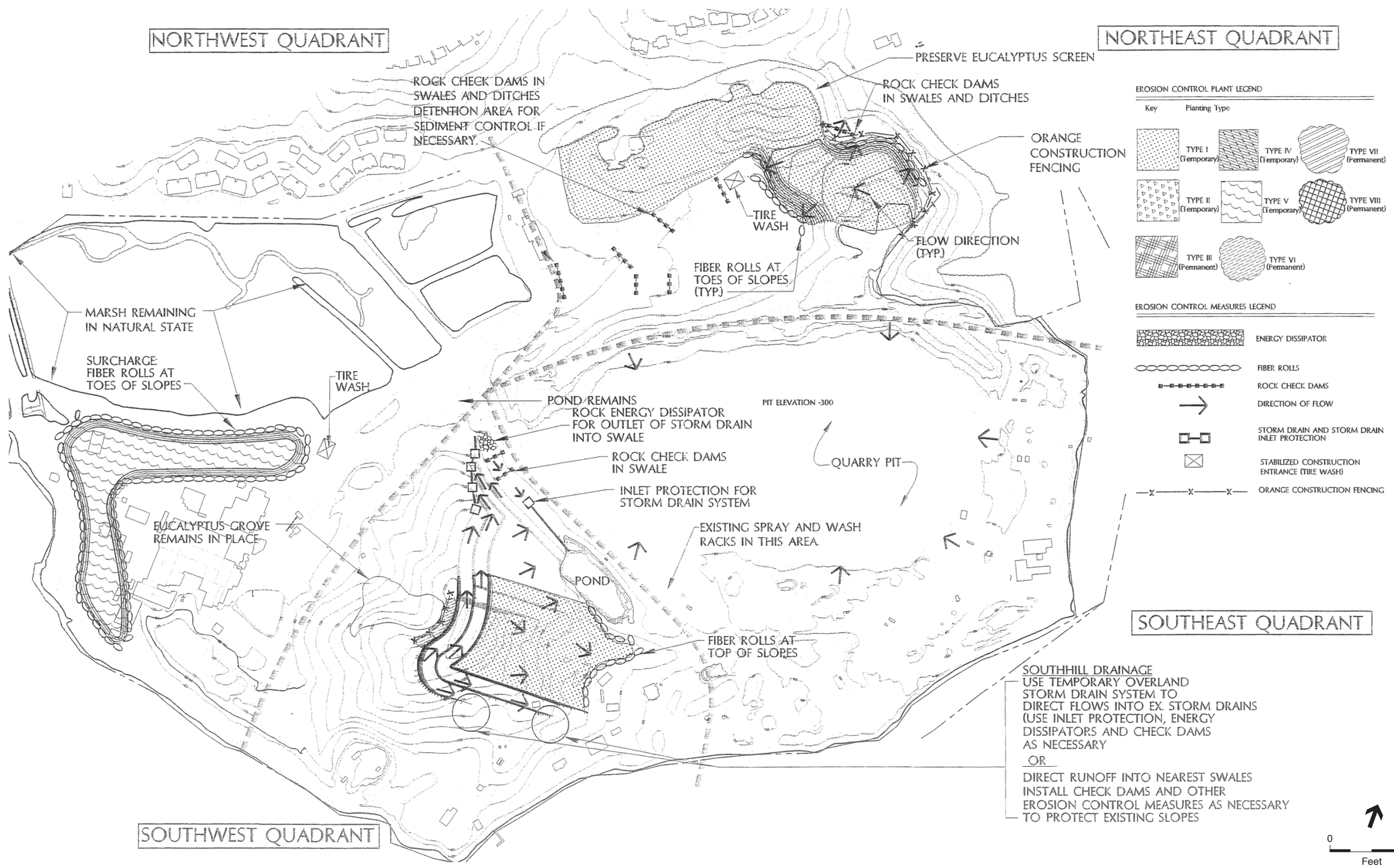
ACTIVITIES IN PHASE 2:

1. CONTINUE PHASE TWO OF SOUTH HILL MINING
2. REMOVE TOP 2' OF TOPSOIL FROM SOUTH HILL AND STOCKPILE IN NORTHWEST QUADRANT.
3. REMOVE 8' OVERBURDEN BELOW THE TOPSOIL AND MOVE TO NORTHEAST AREA.
4. CONTINUE TO MINE QUARRY PIT
5. PLACE OVERBURDEN MIXED AT 4:1 RATIO WITH POND FINES IN ITS EXISTING PLACE AND BUILD UP NORTHEAST AREA 2.
6. USE REMAINING OVERBURDEN AND POND FINES BUILD SURCHARGE AREA IN NORTHWEST AREA.
7. RECONTOURING TO TAKE PLACE FOR 8 TO 10 WEEKS EACH YEAR.
8. MAP SHOWS CONTOURS AT END OF PHASE 2.

SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-11
Phase 2
Grading



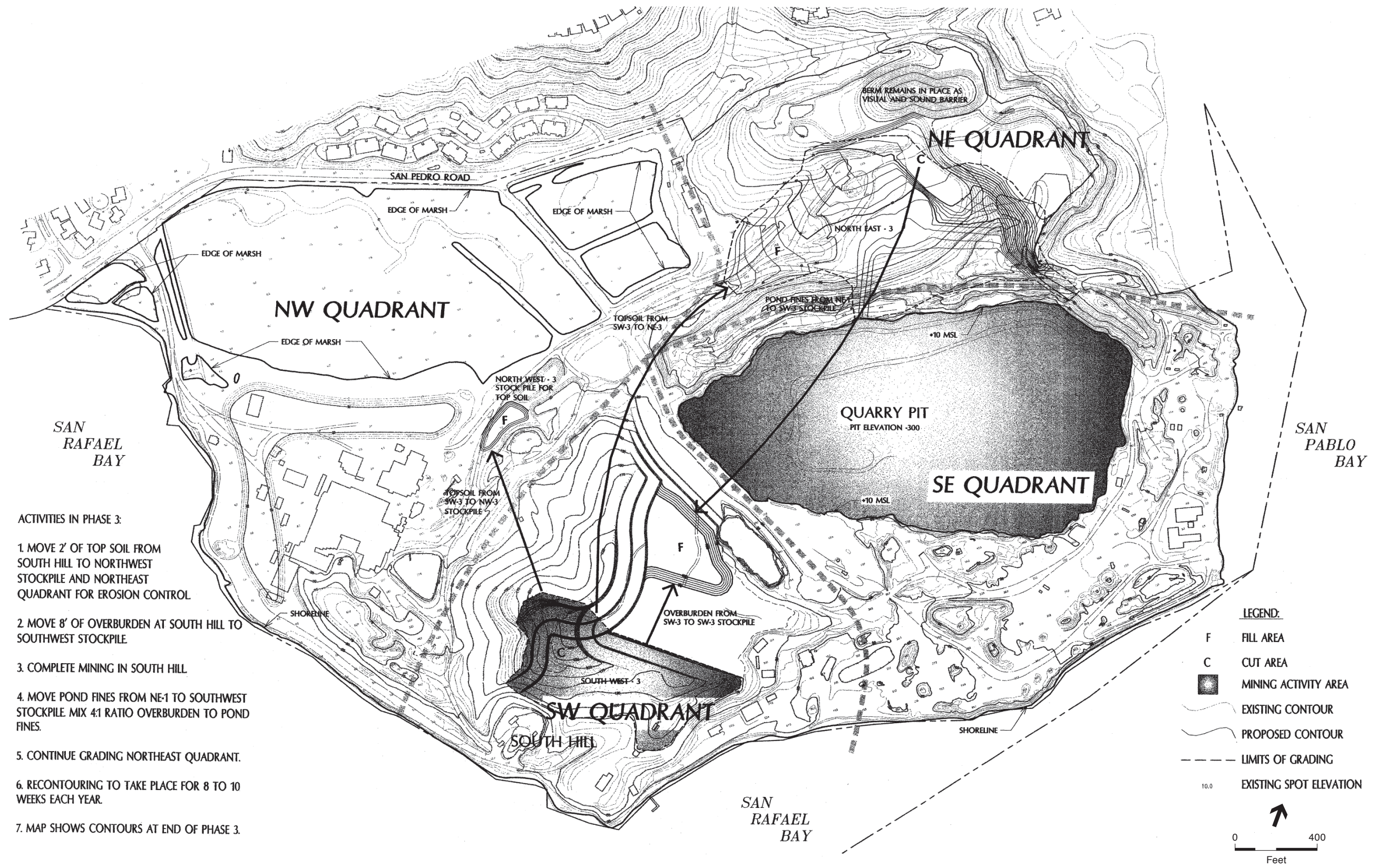
SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-12

Phase 2

Erosion Control and Revegetation



- ACTIVITIES IN PHASE 3:
1. MOVE 2' OF TOP SOIL FROM SOUTH HILL TO NORTHWEST STOCKPILE AND NORTHEAST QUADRANT FOR EROSION CONTROL
 2. MOVE 8' OF OVERBURDEN AT SOUTH HILL TO SOUTHWEST STOCKPILE
 3. COMPLETE MINING IN SOUTH HILL
 4. MOVE POND FINES FROM NE-1 TO SOUTHWEST STOCKPILE MIX 4:1 RATIO OVERBURDEN TO POND FINES.
 5. CONTINUE GRADING NORTHEAST QUADRANT.
 6. RECONTOURING TO TAKE PLACE FOR 8 TO 10 WEEKS EACH YEAR.
 7. MAP SHOWS CONTOURS AT END OF PHASE 3.

LEGEND:

- F FILL AREA
- C CUT AREA
- MINING ACTIVITY AREA
- ~ EXISTING CONTOUR
- ~ PROPOSED CONTOUR
- - - LIMITS OF GRADING
- 10.0 EXISTING SPOT ELEVATION

0 400
Feet

SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-13
Phase 3
Grading

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Southwest Quadrant

1. Remove top two feet of topsoil from South Hill area SW-3 (24,900 cubic yards of material) and stockpile in NW Quadrant or use in NE Quadrant for erosion control.
2. Remove eight feet of overburden from South Hill area SW-2 (74,800 cubic yards of material), mix with 18,700 cubic yards of pond fines from the NE Quadrant stockpile, and create a new stockpile of mixed material within the SW Quadrant.
3. Use an unstated amount of the topsoil removed from SW-3 to re-soil the benches created during mining of SW-1 and SW-2 in phases 1 and 2.

Northeast Quadrant

1. Remove 18,700 cubic yards of pond fines from the stockpile to mix with overburden material in the SW Quadrant.
2. Excavate 186,400 cubic yards of material from the existing berm just to the north of North Hill and mix with 46,600 cubic yards of pond fines from the pond fines stockpile. Place mixed material in fill area of NE-3, compact and contour to final grades. Apply 12,100 cubic yards of topsoil from SW Quadrant and re-vegetate.

Southeast Quadrant

No reclamation activities are planned for the SE Quadrant in Phase 3. During this period, the Main Quarry Bowl would be deepened to an elevation of approximately -300' msl.

In all, Phase 3 re-grading would involve cut and fill of 569,500 cubic yards of material, with a net zero materials balance (though there is some unaccounted-for topsoil to be used in SW Quadrant – presumably would come from one of the NW topsoil stockpiles.)

Phase 3 – Hydrology, Erosion Control, and Revegetation

Planned management of site hydrology, erosion control, and revegetation for Phase 3 reclamation is shown in Figure 3-14; planned revegetation activities are summarized in Table 3-7. Erosion control and revegetation would be consistent with the proposed revegetation and construction standards (see sections 3.6.12 and 3.6.13, below), and similar to those specified for Phase 1 Reclamation.

Phase 4 Reclamation (Years 12–18 following Amended Reclamation Plan Approval)***Phase 4 – Grading***

Planned Phase 4 reclamation grading activities are shown in Figure 3-15. Refer also to Table 3-3 for the anticipated volume of cut and fill material associated with each activity.

Northwest Quadrant

1. Operations would terminate at McNear's Brickyard, and all buildings not scheduled for use under the Development Plan (to be developed 3 years prior to cessation of quarrying operations, per the Conditions for Approval for ARP82 – see Section 3.4, above) would be

demolished. It is likely that the brick kiln and stack would be retained, and the grading plan reflects that this area would not be disturbed.

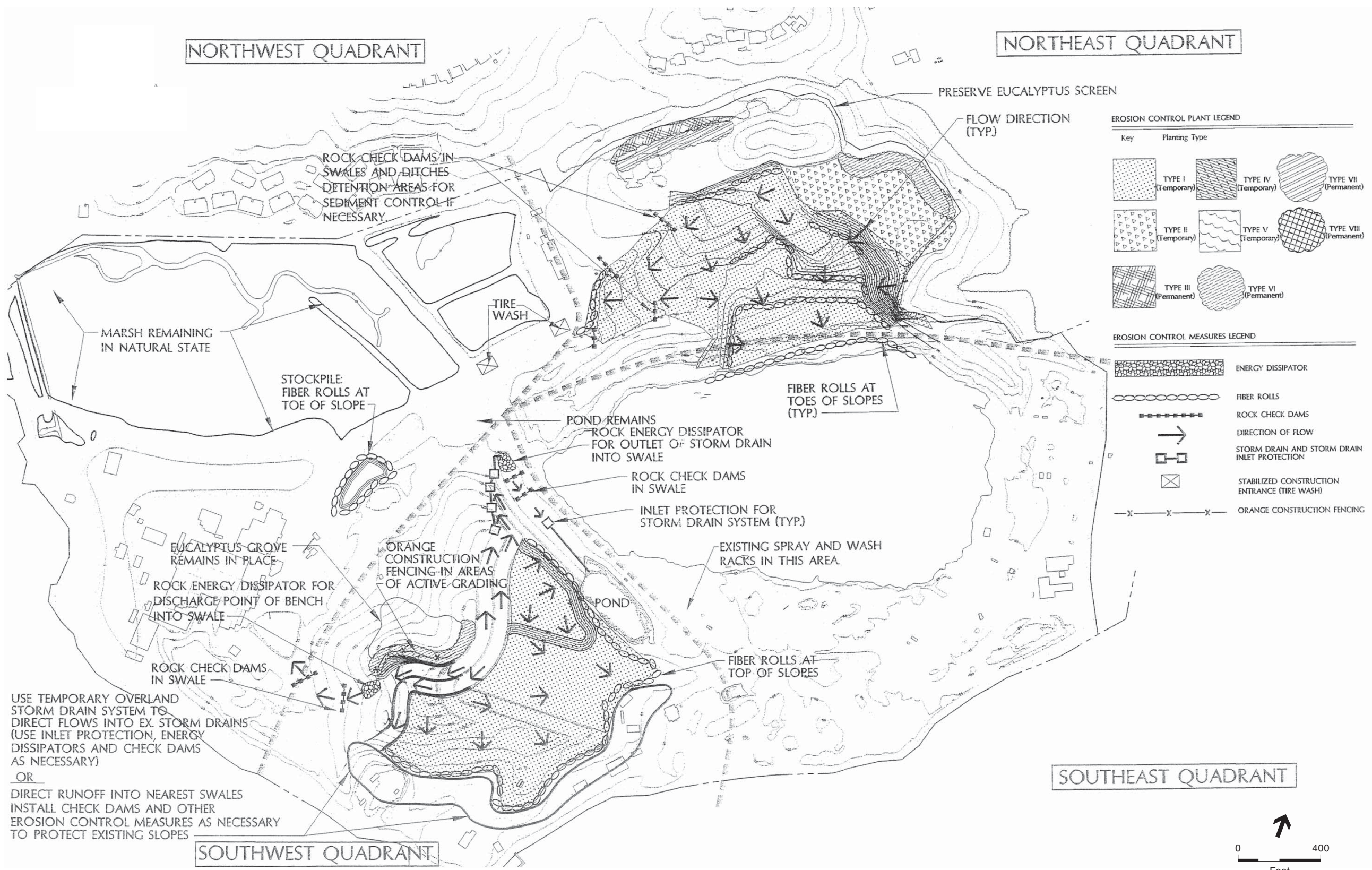
2. Remove the hill located to the south of the brick manufacturing plant to +50' msl, yielding 291,100 cubic yards of material, of which 199,500 cubic yards would be used to bring areas of the NW Quadrant, including the toe of South Hill, to final grade. The remaining material to be used for fill in the SW Quadrant or shipped off-site for levee repair (if shipped off-site this would be considered a part of Quarry operations, not reclamation).
3. The surcharge berm would be removed and this area re-graded to final grade.
4. Additional surcharging would occur, if necessary to achieve sufficient consolidation of the underlying Bay Mud to enable the intended post-reclamation use of this area.
5. Any excess material would be used as fill on-site or sold as quarry or fill products (and therefore is not considered reclamation).

Southwest Quadrant

1. Final soil would be placed on benches and at the toe of the Quarry slope to prepare this area for planting and conversion to post-reclamation uses. This would involve placement of 440,000 cubic yards of material, some of which would come from the NE Quadrant, the remainder from the NW Quadrant.
2. Areas that are to be serviced with utilities may be over-excavated and back-filled with workable material suitable for installation of underground utilities.
3. The Quarry office buildings would be removed.
4. Any excess material would be used as fill on-site or sold as quarry or fill products (and therefore is not considered reclamation).

Northeast Quadrant

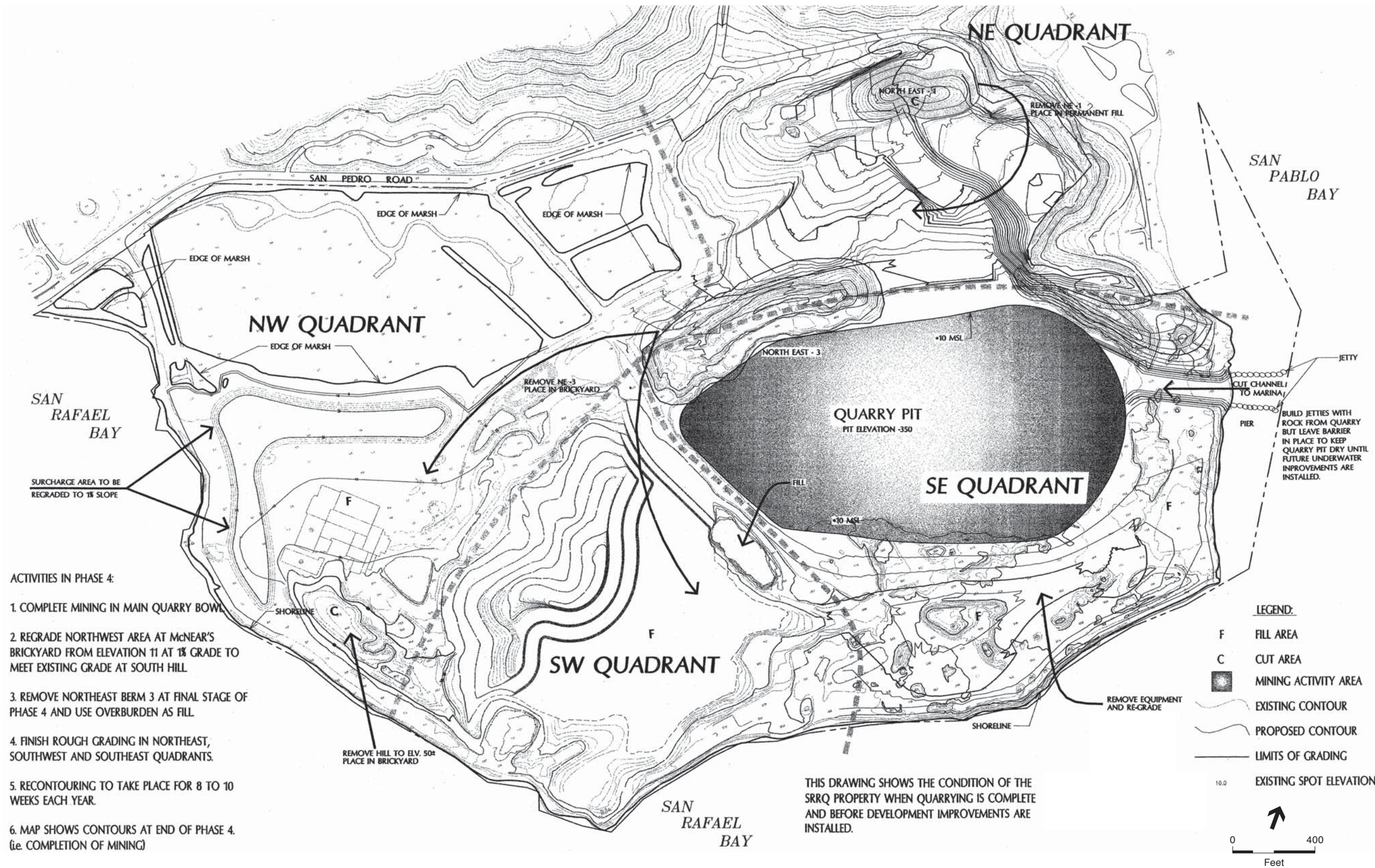
1. The remainder of the berm located to the north of the Main Quarry Bowl would be removed, along with the berm created in Phase 1 at the north end of the property. Total material excavated would be 300,000 cubic yards.
2. Remove remaining pond fines stockpile (- 21,500 cubic yards of material).
3. Finish rough grading and compaction of this area.
4. Areas along the edge of the Main Quarry Bowl may be over-excavated and back-filled with fill to allow for installation of underground utilities.
5. Place 20,000 cubic yards of topsoil from the NW Quadrant stockpiles on final grades.
6. Any excess material would be used as fill on-site or sold as quarry or fill products (and therefore not part of reclamation).



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-14
Phase 3
Erosion Control and Revegetation



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-15
Phase 4
Grading

Southeast Quadrant

1. Complete deepening of the floor of the Main Quarry Bowl to achieve final elevation.
2. Remove crushing and asphalt plants and re-grade the area between the Main Quarry Bowl and the Bay to final grades.
3. Place 14,800 cubic yards of topsoil from the NW Quadrant stockpiles on final grades.
4. Excavate channel to connect the Main Quarry Bowl to the Bay; construct jetties to protect inlet.
5. Any excess material would be used as fill on-site or sold as quarry or fill products (and therefore is not considered reclamation).

Phase 4 – Hydrology, Erosion Control, and Revegetation

Planned management of site hydrology, erosion control, and revegetation for Phase 4 Reclamation is shown in Figure 3-16; planned revegetation activities are summarized in Table 3-4. Erosion control and revegetation are consistent with the proposed design and construction standards (see ~~Sections 3.6.12 and 3.6.13, below~~), and similar to those specified for Phase 1 Reclamation. In addition, the Development Plan, which would be prepared three years prior to the cessation of quarrying activities, would include specifications for enhancement of marsh areas. This may include planting of native marsh species.

Condition of Site at Completion of Reclamation

At the completion of Phase 4 Reclamation activities, the entire Quarry property would be ready for conversion to other uses. ARP04 describes the expected condition of the site at the completion of reclamation as follows:

- The Main Quarry Bowl would have been completed to the side slopes and depths shown in Figure 3-15. Quarry faces would be left clean blasted, and quarry benches would be cleared of debris and equipment;
- The lip of the Main Quarry Bowl would have been completed to conform with the final footprint shown in Figure 3-15 – i.e., the current understanding of the +10' msl interface between the hard rock resource and shale;
- The entrance channel connecting the Main Quarry Bowl to the Bay would have been excavated. Following completion of mining activities and final grading in the Main Quarry Bowl, the channel would be opened, allowing the Main Quarry Bowl to flood.
- The south side of South Hill would have been mined to create a series of development benches, backfilled with engineered fill to allow future development, and revegetated to control erosion;
- The NE Quadrant would have been re-contoured to allow future development planes;

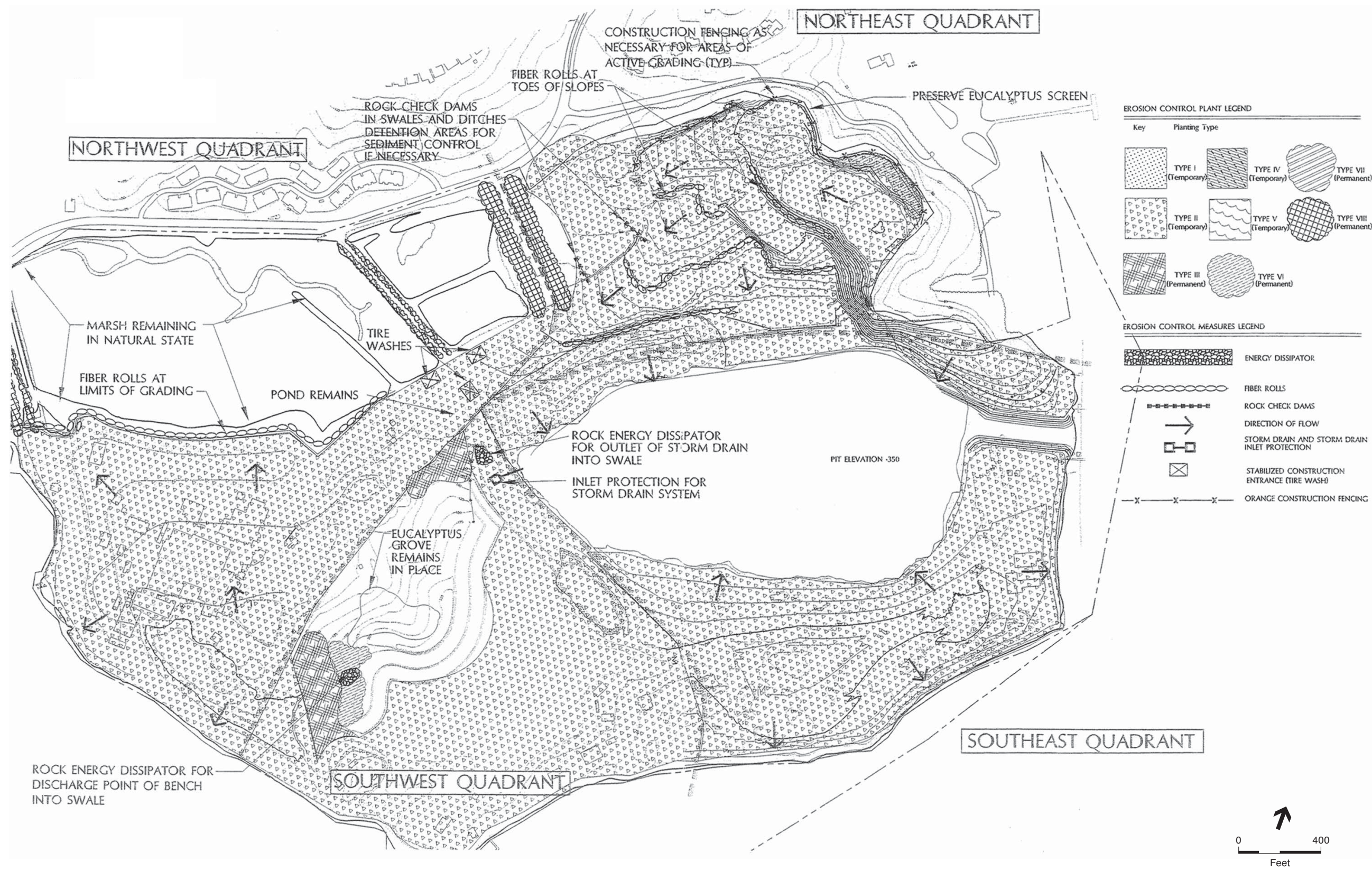
- All future development areas underlain with bedrock or consolidated fill would have an overlay of consolidated fill material to facilitate installation of utilities and future construction, with soil mixed and amended to allow revegetation;
- Selected areas would have been pre-planted with permanent landscaping which would have reached varying levels of maturity;
- The entire site would have been cleared of debris and equipment, in compliance with SMARA. Offshore pilings and piers will be removed at end of the quarrying operation.
- All five areas set aside for preservation, having been protected during the period of quarrying activities and reclamation, would be available for any final restoration work, to be specified in the Development Plan;
- The Development Plan would have been submitted; review of the Development Plan would commence three years prior to completion of quarrying.

Amended Reclamation Plan Project Element 2: Increased Depth and Lateral Extent of the Main Quarry Bowl, and Modified Configuration of Connecting Channel

ARP82 specified that the Main Quarry Bowl would be excavated back to the point where the +10' msl contour line reaches the interface between the hard rock resource and the adjoining shale. This contour line would then form the rim of the harbor once the Main Quarry Bowl was connected to the Bay and flooded. In the time since ARP82 was adopted, the Quarry has learned the true position of the point of intersection of rock types at the +10' msl contour. Excavating to this line would result in a larger harbor, and a smaller area around the harbor that would be available for development after reclamation, compared to the description contained in ARP82. The area available for marina commercial uses would be reduced from approximately 35 acres under ARP82 to 25.4 acres under ARP04. The surface area of the harbor basin would be approximately 47 acres at mean sea level, compared to approximately 40 acres anticipated in ARP82.

In addition, since ARP82 was adopted, the Quarry has learned that the hard rock resource extends to a much greater depth than previously known. Based on this finding, on geotechnical studies of Quarry slope stability, and on advances in mining techniques, ARP04 proposes to alter the final grade of the Main Quarry Bowl. SRRQ now proposes a final depth of the Main Quarry Bowl averaging -350' msl, with a maximum depth of -400' msl (Figure 3-15). Deeper excavation would be accomplished by adopting a 60 degree average overall slope angle for the walls of the Main Quarry Bowl, with benches at least 30' wide at 90' intervals. The southerly perimeter of the Main Quarry Bowl would be straightened to increase wall strength in that location (Figure 3-8).

ARP04 specifies that, as part of site reclamation, the channel connecting the Main Quarry Bowl to the Bay will be excavated "in the dry". At the conclusion of the fourth and final phase of reclamation, the narrow barrier separating the Main Quarry Bowl from the Bay would be excavated in order to flood the Main Quarry Bowl. In order to keep currents in the channel high enough to limit sediment deposition for occurring within the entrance channel once the



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 3-16
Phase 4
Erosion Control and Revegetation

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connection to the Bay is completed, SRRQ now proposes a more narrow, deeper channel than previously planned: the hydrology study for the proposed marina by Prof. Ray Krone of U.C. Davis, which was attached to ARP82, states that the channel would be 100 feet wide and 8 feet deep. SRRQ now proposes constructing a channel 75 feet wide, with a depth of 12 feet below mean lower low water (MLLW), and with 2H:1V side slopes.

Amended Reclamation Plan Project Element 3: Mixing of Pond Fines for Use as Engineered Fill

Use of pond fines mixed with other materials for engineered fill for site reclamation was not explicitly discussed in ARP82. Pond fines are the byproduct of processing, crushing, and washing the rock products produced on-site, and meet the definition provided by SMARA of mining waste (Public Resources Code §2730). The material is extremely fine-grained, and is composed largely of inert minerals. The material is devoid of organic material. A large amount of this material is already present on-site, mostly stockpiled in the NE Quadrant, though the Quarry no longer produces pond fines. The applicant proposes mixing the stockpiled pond fines with overburden at a ratio of one part pond fines to four parts overburden for use in engineered fills in the areas designated for such in the Amended Reclamation Plan. ~~These areas are described in Section 3.6.1, above. Additional detail regarding the use of pond fines mixed with other materials for engineered fills and slopes is discussed in section 3.6.12, below.~~

Amended Reclamation Plan Project Element 4: New Northeast Quadrant Temporary Berm

During the proposed first phase of reclamation (see 3.6.1, above), the applicant proposes constructing a temporary berm in the northern portion of the NE Quadrant, to provide a sound and visual barrier for neighbors in the Marin Bay Park development to the north (Figure 3-9). The berm is intended to screen other reclamation activities in the NE Quadrant during the four phases of reclamation, as well as quarrying activities in other areas of the site. The berm would be a trapezoidal feature approximately 70 feet above existing grade, and 300 feet wide by 600 feet long, with 2:1 side slopes. The berm would be hydroseeded and landscaped on all faces to soften its appearance and control erosion. The berm would not displace the existing mature grove of trees along the northern property boundary. The berm would remain in place throughout the first three phases of reclamation, and would be removed at the end of the fourth phase. The berm would be constructed from a mixture of pond fines and overburden material, some of which is already in stockpiles in the NE Quadrant, and some of which would originate from quarrying activities in the SW Quadrant. The construction would occur only during a 10-week maximum time period, presumably during the dry season. In all, 171,700 cubic yards of material would be used to construct the berm. Another 86,800 cubic yards of pond fines, currently stockpiled in the NE Quadrant, would be placed in a new stockpile on the south side of the new berm for use in later reclamation activities. Construction of a berm in this location was not considered in ARP82, and so is considered a new project element.

Amended Reclamation Plan Project Element 5: Surcharge Berm in the Northwest Quadrant

The applicant proposes constructing a surcharge berm during Phase 2 Reclamation in a portion of the NW Quadrant during the second phase of reclamation. The surcharge berm would be constructed in an area now occupied by McNear's Brickyard, and used for inventory and storage. This area is underlain by soft, compressible Bay Mud. The weight of the surcharge berm would be used to compress the underlying Bay Mud, and so increase its strength. This would enable post-reclamation use of this area for structures. As shown in Figure 3-11, below, the surcharge berm would be a boomerang-shaped fill structure covering about 5.6 acres, with a top deck elevation of +25' msl (15 feet above existing grade). In Phase 3, the surcharge berm would be re-contoured and compacted to achieve final grades and compaction. Once completed, the area occupied by the surcharge berm may again be used by McNear's Brickyard. The volume of the surcharge berm would be approximately 218,100 cubic yards, consisting of overburden material from South Hill and material currently stockpiled in the NE Quadrant, mixed with pond fines.

Amended Reclamation Plan Project Element 6: Jetties

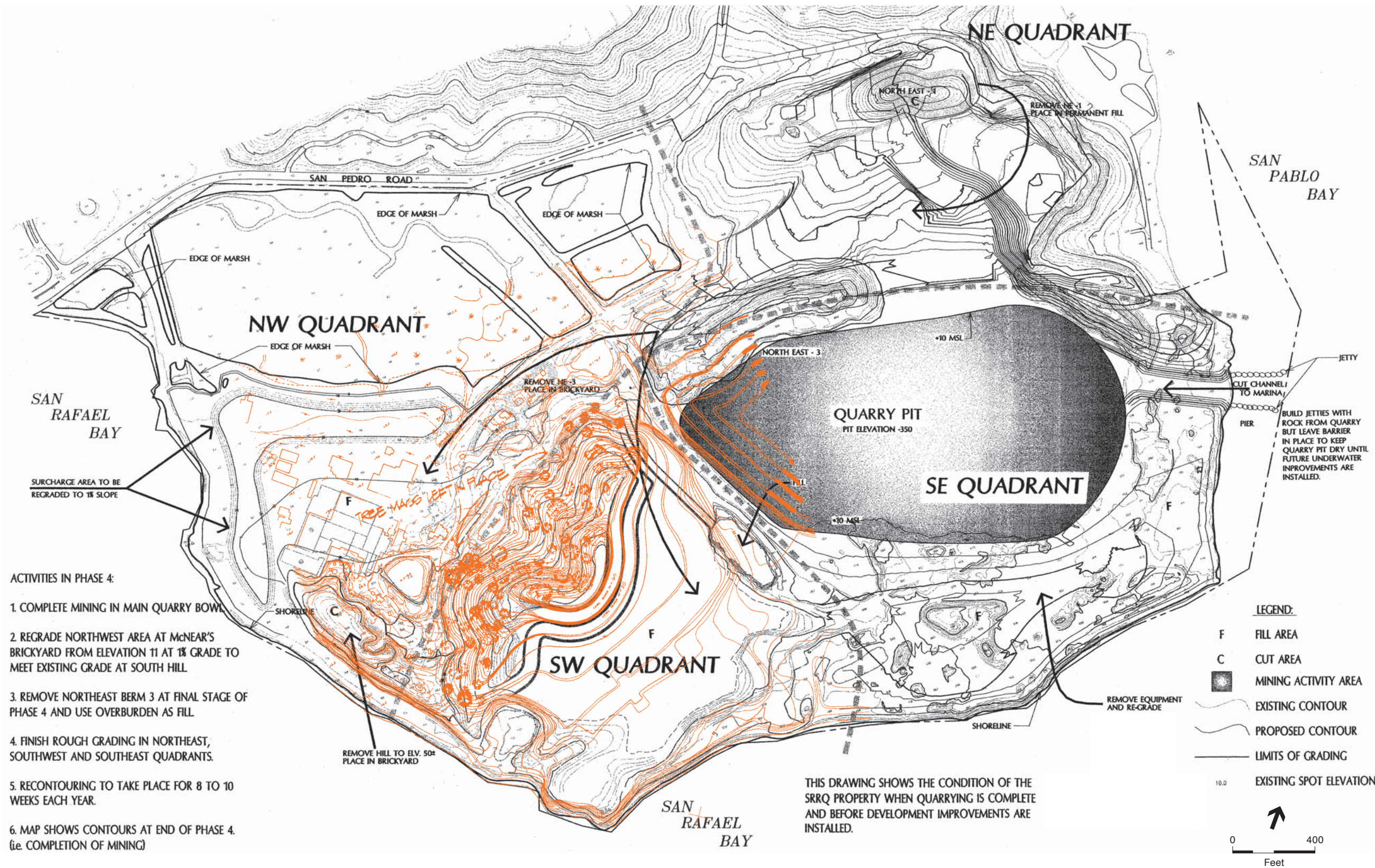
The applicant proposes to construct jetties on either side of the channel that would be constructed to connect the Main Quarry Bowl to the Bay. The purpose of the jetties would be to protect the channel from rapid siltation. The hydrology study by Dr. Ray Krone of U.C. Davis attached to ARP82 describes "short rock jetties" to protect the harbor entrance. The jetties would be necessary to prevent the migration of sediment from the sand and mudflats located immediately adjacent into the proposed entrance channel. ARP04 modifies the description of the jetties: they would extend out into the Bay about 200 feet, to a depth of approximately 5 feet below the mean lower low water level. The jetties would be built with rock from the Quarry.

Amended Reclamation Plan Project Element 7: Alterations to the Final Contours of South Hill

The final grading plan for ARP04 (Figure 3-15), when compared to the final grading plan from ARP82 indicates minor changes in the final contours of the south side of South Hill. These changes are illustrated in Figure 3-17 by overlaying (in orange) the ARP82 final contours on the ARP04 contours (in black).

Amended Reclamation Plan Project Element 8: Removal of McNears Brickyard Structures

While ARP82 discussed post-reclamation commercial development of the NW Quadrant, it was silent on the issue of the disposition of the structures associated with McNear's Brickyard. SRRQ now proposes removal of most of these structures, though some of the structures, such as the brick kiln and its stacks, may be retained. Some structures would be removed during the construction of the surcharge berm during reclamation Phase 2; others would be removed during Phase 4 Reclamation.



- ACTIVITIES IN PHASE 4:
1. COMPLETE MINING IN MAIN QUARRY BOWL
 2. REGRADE NORTHWEST AREA AT McNEAR'S BRICKYARD FROM ELEVATION 11 AT 1% GRADE TO MEET EXISTING GRADE AT SOUTH HILL
 3. REMOVE NORTHEAST BERM 3 AT FINAL STAGE OF PHASE 4 AND USE OVERBURDEN AS FILL
 4. FINISH ROUGH GRADING IN NORTHEAST, SOUTHWEST AND SOUTHEAST QUADRANTS.
 5. RECONTOURING TO TAKE PLACE FOR 8 TO 10 WEEKS EACH YEAR.
 6. MAP SHOWS CONTOURS AT END OF PHASE 4. (i.e. COMPLETION OF MINING)

THIS DRAWING SHOWS THE CONDITION OF THE SRRQ PROPERTY WHEN QUARRYING IS COMPLETE AND BEFORE DEVELOPMENT IMPROVEMENTS ARE INSTALLED.

JETTY
CUT CHANNEL TO MARINA
PIER
BUILD JETTIES WITH ROCK FROM QUARRY BUT LEAVE BARRIER IN PLACE TO KEEP QUARRY PIT DRY UNTIL FUTURE UNDERWATER IMPROVEMENTS ARE INSTALLED.

LEGEND:

- F FILL AREA
- C CUT AREA
- ☐ MINING ACTIVITY AREA
- EXISTING CONTOUR
- PROPOSED CONTOUR
- LIMITS OF GRADING
- 10.0 EXISTING SPOT ELEVATION

0 400
Feet

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Amended Reclamation Plan Project Element 9: Stockpiling of Topsoil in the NW Quadrant

ARP04 provides new detail on stockpiling of material in the NW Quadrant not included in ARP82. SRRQ now proposes to establish three adjacent stockpiles for topsoil within the NW Quadrant, at the base of South Hill and north of the Brickyard. One stockpile would be established in each of the first three reclamation phases, and the material would later be used for resoiling the area now occupied by McNear's Brickyard, after demolition of the Brickyard structures and re-grading of the site during Phase 4 of reclamation. In all, 34,800 cubic yards of topsoil would be stockpiled in the NW Quadrant.

Amended Reclamation Plan Project Element 10: Extension of Quarrying and Delay in Completion of Site Reclamation

Extending the depth and lateral extent of the Main Quarry Bowl (~~see section 3.6.7, above~~) would substantially increase the total volume of the hard rock resource available for mining. Given the projected demand for the Quarry's products, SRRQ estimates that completion of mining will occur approximately 15-17 years after approval of ARP04. Assuming approval of the plan would occur during 2008, quarrying would continue until some time between 2023 and 2025.

Amended Reclamation Plan Project Element 11: Construction and Design Standards

The applicant proposes establishing several standards for engineered fills and slopes to be used in establishment of temporary and final grades in reclaimed areas of the property. Detailed design and construction standards for reclamation activities, not stated in ARP82, are added in ARP04 to bring the ARP up to current SMARA standards and expectations. Because such standards were not included in ARP82, they are considered project elements for this EIR.

Standards for Quarried Slopes

Generally, the slopes created by quarrying activities would become the final slopes to support reclamation and post-reclamation use. Slope standards are provided for the two main areas of the property subject to quarrying, the Main Quarry Bowl, and the south side of South Hill. These standards are based on slope stability analysis conducted by SRRQ's consultants.

A. Main Quarry Bowl

- Average overall Quarry slope: 60 degrees;
- Face slopes: 75 degrees;
- Benches: 30' minimum at 90' vertical intervals;
- Minimum overall Factor of Safety at -350' msl depth (flooded condition): seismic 1.15, static 1.50;
- Lip of the Quarry to be set at +10' msl; and

- Access to benches for maintenance, no planting on benches.

B. South Hill

- Average overall Quarry slope: 60 degrees;
- Face slopes: 75 degrees;
- Benches: 60' minimum at 45' vertical intervals;
- Minimum overall Factor of Safety: seismic 1.15, static 1.50;
- Main development planes to be created at elevations +75' to +30' msl to afford future sites with views to the Bay;
- Debris catchment area and berm to be provided between the toe of the slope and future development;
- Access to benches for maintenance, no planting on benches due to unsuitability of the rock as a substrate for plants and to maintain clear access for maintenance equipment; and
- Top of the slope between the face and the preserved woodland to be revegetated.

Standards for Reclamation Grading

ARP04 provides design and construction standards that would apply to all future reclamation grading. Standards are presented for permanent and temporary fills and slope, as shown in Tables 3-6 and 3-7, and for fill material types, shown in Table 3-5. Where new permanent fills are to be placed over existing permanent fills (e.g. in the McNear's Brickyard area and in the rock processing area of south of the Main Quarry Bowl), a site-specific geotechnical report would be completed as part of the process of obtaining a grading permit for that phase of the work, and the geotechnical recommendations of the report would be followed in the implementation plans for the permit. The standards for temporary fills and slopes also apply to areas that need surcharge pre-consolidation, topsoil stockpiles, and berms.

**TABLE 3-5
DEFINITIONS OF FILL MATERIALS**

Material	Source	Notes
Topsoil	Top 1-2 feet of material that overlays the rock resource	The main source of topsoil would be the areas to be quarried in the SW Quadrant. Topsoil would be stockpiled in the NW Quadrant for later use in revegetation after final contours have been achieved in a given area.
Overburden	Material including soil and weathered rock that lies between topsoil and the rock resource	Overburden excavated in past operations is stockpiled in the berm along the north face of the Main Quarry Bowl, providing visual and noise buffer. Future source of overburden is the areas to be quarried in the SW Quadrant. Future use is for fill material to achieve final contours.
Pond Fines	By-product of processing, crushing, and washing rock products produced on-site	Very fine material that is devoid of organics. A considerable amount was formerly produced and there is already a large amount stockpiled on-site, mostly in the NE Quadrant. Would be mixed with overburden at a ratio of 4 parts overburden to 1 part pond fines for use in engineered fills on site. As the Quarry no longer produces a washed product, it no longer produces pond fines as a by-product.

**TABLE 3-6
STANDARDS FOR PERMANENT FILLS AND SLOPES**

Position on Grade	Expansive Material ^a Relative Compaction	Expansive Material ^a Moisture Content	Non-Expansive Material Relative Compaction	Non-Expansive Material Moisture Content	Maximum Slope (Horizontal: Vertical)	Benches	Materials
Upper 5' of Finished Grade	87-92%	±5%	90%	±2%	2:1	6' minimum width, at 30-foot vertical intervals	Overburden may be mixed with pond fines at 4:1 ratio
Between 5' and 50' of Finished Grade	90%	±4%	95%	±2%	2:1	6' minimum width, at 30-foot vertical intervals	Overburden may be mixed with pond fines at 4:1 ratio
Over 50' below Finished Grade	95%	±3%	95%	±2%	2:1	6' minimum width, at 30-foot vertical intervals	Overburden may be mixed with pond fines at 4:1 ratio

^a Expansive material includes clay soils.

**TABLE 3-7
STANDARDS FOR TEMPORARY FILLS AND SLOPES**

Position on Grade	Compaction	Maximum Slope (Horizontal:Vertical)	Maximum Slope if allowed by Geotechnical Engineer (Horizontal:Vertical)	Benches
All	Track and wheel rolling is acceptable	1.5:1	1:1	Not required

Standards for Overlays to Cut Rock Surfaces

The hard, dense nature of the site's bedrock renders surfaces left by mining difficult to modify. In areas where post-reclamation developments are planned, therefore, rock surfaces would be over-cut and replaced or backfilled with overburden material to facilitate excavation for underground utilities and other underground improvements.

Standards for Stormwater and Erosion Control of Reclaimed Areas

Standards for on-site stormwater and erosion control for areas of the site being reclaimed or where phased reclamation activities have taken place would adhere to the terms of SRRQ's draft Stormwater Pollution Prevention Plan (SWPPP) and Stormwater Management Plan (see Table 3-1). Erosion from stormwater runoff would be controlled primarily through establishing permanent and temporary vegetation on slopes. Fiber rolls, erosion control fabric, and other

structural erosion prevention measures would be used as needed to address areas where erosion problems occur.

Stormwater management and erosion control measures used during reclamation would adhere to the following standards:

- Best Management Practices would be used in reclaiming all disturbed areas; and
- Sediment transport would be minimized through early hydroseeding and planting.

Specific measures would be selected by terrain, as follows:

Exposed slopes

- Track walk perpendicular to downslopes;
- Hydroseed according to design and construction standards for revegetation (see below);
- Use erosion control blankets in areas that may need special attention; and
- Place straw fiber rolls at 30' vertical intervals on temporary slopes over 30' high.

Steep swales

- Use rock check dams where needed;
- Use fiber rolls where needed; and
- Use erosion control blankets for permanent problem areas.

Flat swales

- Use fiber rolls as needed;
- Plant willows if the problems occur in a permanent swale; and
- Hydroseed according to design and construction standards for revegetation (see below).

Temporary planes on which additional fill would be placed

- Hydroseed with quick growth annual grass;
- Place straw binder on ground to disperse rainfall; and
- Place fiber rolls at 100' on center on slopes over 12 percent.

Finished planes ready for end use

- Hydroseed with quick growth annual grass.

Amended Reclamation Plan Project Element 12: Standards for Revegetation of Reclaimed Areas

ARP04 provides standards for revegetation of disturbed areas, including material stockpiles and berms, permanent fills, and temporary fills. Included are standards for soil preparation to establish a horticulturally suitable planting medium. Topsoil removed from areas to be quarried and

stockpiled would be incorporated back into the site as reclamation grading and site work proceeds. Prior to installation of topsoil, all compacted subgrade would be loosened or ripped to a depth of six inches to improve porosity. The amended topsoil would then be integrated into the top six inches of existing soil to obtain a homogeneous blend.

Irrigation would be required for some amended soils after installation and grading to reduce the salinity that occurs in the native soil and to leach salts past the immediate root zone. For each of the four phases of reclamation (see description of each reclamation phase, below), SRRQ would obtain a grading permit that, among other provisions, includes an irrigation system design to promote salt leaching. After leaching is completed, the soil would be re-tested for planting suitability, and further amended or leached as required.

Planted areas would be mulched and periodically fertilized. Seeded areas would be inspected after germination for coverage, and reseeded as necessary to maintain a minimum of 70 percent cover. Planted areas would be inspected periodically for the presence of noxious weeds and to review the viability of deer and varmint browse protection measures installed at the time of planting. Protected growing conditions for plants would be maintained for a period of one year.

ARP04 presents eight revegetation types designed for different applications. Included for each type are planting methods, species, and planting rates. The eight types are summarized below. Species lists and planting methods for each type are included in Appendix L.

- Type I: temporary vegetative erosion control – cut and fill slopes (areas to be re-graded with reclamation)
- Type II: long-term vegetative erosion control – cut and fill slopes (areas where reclamation has been completed or for areas where reclamation is set for future final land use)
- Type III: permanent open space revegetation – hydroseed (areas where reclamation and no future land use is expected)
- Type IV: swale hydroseed mix (areas of new earthen swales utilized for storm water runoff)
- Type V: topsoil stockpile hydroseed mix (soil stockpiles that would be seeded to reduce runoff and erosion)
- Type VI: permanent open space revegetation (includes graded areas that are to be permanently revegetated but require native shrub, tree, and groundcover plantings for habitat enhancement)
- Type VII: permanent open space – planting screen (includes graded areas that are to be permanently revegetated but require shrub, tree, and groundcover plantings for visual enhancement and screening)
- Type VIII: circulation corridors (visual enhancement and delineation of areas designated to be major circulation corridors)

Amended Reclamation Plan Project Element 13: Standards for Preserving Sensitive Habitat Areas

ARP04 carries forward from ARP82 protection of several areas of the property that have important biological and aesthetic characteristics. These areas would be protected during the period of continued quarry operations, with recommendations for further enhancement of each area considered in the Development Plan, which would be prepared three years prior to cessation of quarrying activities.

SRRQ would conduct biological surveys of areas to be disturbed in each of the four reclamation phases (see below). The results of the surveys would be used as a basis for determining whether any permits are required to proceed with the next phase of reclamation. Biological permitting for each reclamation phase may require additional environmental review under CEQA or NEPA.

ARP04 presents general standards for preservation of each of the sensitive habitat areas during reclamation.

Saltwater and Brackish Marsh Areas in the Northwest Quadrant

The saltwater and brackish marsh areas in the NW Quadrant would be protected by maintaining a setback from the edge of the existing marsh, maintaining high quality stormwater runoff, and keeping the outlet works of the marsh in good working order to ensure tidal exchange. Stormwater quality would be monitored. The setback would align with the edge of current operations, including the edge of existing pavement and/or storage areas in the McNear's Brickyard storage area. No minimum setback distance is proposed.

Native Grassland Areas in the Northeast and Northwest Quadrants

Native grassland areas include the Grassy Knoll in the NE Quadrant and areas on South Hill. Work would be planned to avoid disturbing these areas. Prior to any work in adjacent areas, orange construction fencing would be placed to minimize equipment encroachment into sensitive areas.

Oak and Eucalyptus Woodlands

Oak and eucalyptus woodlands that would be protected include the eucalyptus grove on the north side of South Hill and the perimeter trees on the northern property boundary along Cantera Way (the entrance road to the County Park) in the NE Quadrant. Reclamation activities would be planned to avoid these areas, and construction fencing would be placed around sensitive areas to minimize equipment encroachment.

On the new crest of South Hill, a 50' wide buffer would be provided from the limit of work to the edge of the eucalyptus grove. On woodland areas in the SW Quadrant that would be removed as a part of quarrying, vegetation removal would be avoided during nesting season. Nesting surveys

would be performed prior to removal of woodlands on the south side of South Hill for raptor nests. If nests are found, work would be delayed in the area until after the nesting season.

Process Ponds in the Northwest Quadrant

Several process water ponds in the NW Quadrant could potentially support California red-legged frog or other protected species. Prior to filing for County of Marin Grading Permits for each reclamation phase, the applicant would complete a survey of any ponds that could be disturbed to determine whether California red-legged frog or other protected species are present. If so, the applicant would enter into discussions with the appropriate regulatory agencies to determine avoidance and/or mitigation measures required. This may require additional permits and environmental review under CEQA or NEPA. The ponds would continue to be used for process water, as required for Quarry operations.

Bayfront Shoreline

The applicant has not put forth specific plans for development within 100' of the line of highest tidal action or the Bay shoreline, the area within BCDC jurisdiction, but anticipates that detailed plans will be included in the final Development Plan, to be submitted three years prior to the cessation of quarrying at the site. Figure 3-8 indicates residential, commercial and mixed use, community facilities, and open space uses within 100' of the existing shoreline and the new shoreline that would be created by connection of the Main Quarry Bowl to the Bay.

Existing Swales and Sloughs

In existing swales and slough channels, the applicant would maintain water flow during reclamation activities. Inlets would be protected from silt through the use of filter fabric, fiber rolls, or upstream Best Management Practices. A 10' setback would be maintained between reclamation activities and the head of each jurisdictional ditch or gully, and construction fencing would be placed around sensitive areas when reclamation activities are occurring in the vicinity.

Setback Criteria for Final Land Uses

ARP04 states that a detailed schedule of setbacks would be included in the site's Development Plan, to be developed three years prior to end of quarrying activities. Setback standards are likely to apply to the following areas:

- a. Marsh areas;
- b. Areas of the property within Marin County's Bayfront Conservation Zone;
- c. BCDC Jurisdictional Lands (within 100 feet of the Bay shoreline); and
- d. Other Water Areas (including process ponds).

Amended Reclamation Plan Project Element 14: Ferry Landing

The applicant proposes adding a ferry landing at the location of the present barge loading pier as a post-reclamation site use. Details regarding development of a ferry landing and terminal would be included in the final Development Plan, to be submitted three years prior to the cessation of quarrying.

3.4.6 Post-Reclamation Use of the Site

Conceptual plans for post-reclamation use of the SRRQ property were first developed in the 1976 Reclamation Plan, which was never approved by the County, and refined in ARP82. These uses were incorporated into the Peacock Gap Neighborhood Plan. The same planned uses for the site are brought forward in ARP04, with some additional refinements. Planned land uses are shown in Figure 3-8, and include the following:

- A harbor, including a 600-slip marina, in the flooded Main Quarry Bowl;
- Marina-commercial and mixed uses (including residential units) around the harbor in the SE Quadrant, occupying approximately 25.4 acres;
- Waterfront residential development along the perimeter of the marina lagoon;
- Single family and townhouse development in the NE and SE Quadrants, with the same general densities, lot sizes, and general character as the Peacock Gap neighborhood;
- Denser housing on the flat planes overlooking the Bay on the south side of South Hill in the SW Quadrant;
- Neighborhood-serving commercial and administrative/professional developments in the NW Quadrant, occupying about 15.7 acres in a portion of the area currently occupied by the McNear's Brickyard. An additional 15.3 acres of the NW Quadrant would be used for residential development. Most of the existing McNear's Brickyard buildings would be demolished, with the possible exception of some structures deemed to have historic cultural significance. For the purpose of the EIR analysis, it will be assumed that all structures would be demolished;
- A small neighborhood-serving country club at the base of the knoll in the NE Quadrant;
- A ferry landing in the area of the existing barge loading facility. This feature is described as “possible” in ARP04; and
- Total area for residential development is approximately 102.9 acres.

3.5 Project Description: Amended Surface Mining and Quarrying Permit

This section describes the Amended Surface Mining and Quarrying Permit (AQP) project. The principal sources of information are the applicant's letters to the Marin County Department of Public Works dated October 27, 2004 and December 14, 2004 (Dutra Materials, 2004a; 2004b).

3.5.1 Site Uses Included in the Baseline for the Amended Surface Mining and Quarrying Permit

As previously stated, the baseline for this project includes the scope of the permitted use at the time the zoning for the property changed in 1982, when quarrying became a legal, non-conforming use. While the uses of the property in 1982 are well-understood, only limited information is available on the scale and extent of many of the quarrying, processing, and shipping activities occurring on the property at that time. Based on a review of available documents, including the 1982 Amended Reclamation Plan (Norman T. Gilroy and Associates, 1982) Marin County documents from 1982 (Marin County, 1982a, 1982b), the Peacock Gap Neighborhood Plan (City of San Rafael, 1980), aerial photographs, the Marin County Superior Court's Statement of Decision (Marin County Superior Court, 2004a), Marin County staff reports (Marin County Community Development Agency, 2000), and documents from the County's files on the Quarry (Charles M. Salter Assoc., 1982) the activities listed below have been established as occurring at the Quarry in 1982. These are considered baseline activities and levels for the purposes of the environmental analysis that follows.

- Hard rock quarrying, including blasting was confined to the SW and SE Quadrants;
- The Court found that the Quarry had intended to continue quarrying the Main Quarry Bowl to the extent doing so was profitable, i.e., without respect to duration or depth, as well as their intent to mine South Hill only to the limited extent reflected in ARP82;
- Brick manufacturing occurred in the NW Quadrant;
- Quarrying of shale and clay occurred in the NE Quadrant;
- The Quarry operated several plants on site, in the SE Quadrant. These included rock crushing, washing, and screening plants, and an asphaltic concrete batching plant;
- Process water storage and sedimentation ponds were located in the SE, SW, and NW Quadrants;
- Various materials handling activities occurred on site, including transport of materials, stockpiling of raw quarry materials and finished product, and loading trucks and barges;
- Sand was brought to the Quarry from off-site for use in asphalt production; however, no gravel, materials for recycling, or dredged materials were brought to the site;
- Several office buildings and employee housing units were located on the property;

- The level of production for the Quarry in 1982 was 1,473,000 tons of finished product; for the prior two years, the levels were 1,467,000 tons in 1980 and 1,304,000 tons in 1981. In 1979, production levels were about half of 1980 levels (Marin County Community Development Agency, 2000). The average annual production level for the period 1980–1982 was 1,414,667 tons. See Table 3-8.

**TABLE 3-8
QUARRY PRODUCTS PRODUCTION AND ESTIMATED TRUCK TRIPS, 1980–1982**

Year	Production Level (tons)	Assume 1/2 Shipped by Truck (tons)	Operating Days per Year	Avg. Daily Production	Avg. Truckload (tons)	Avg. No. of Loads per Day	Avg No. of Truck Trips per Day
1980	1,467,000	733,500	240	3,056	20	153	306
1981	1,304,000	652,000	240	2,717	20	136	272
1982	1,473,000	736,500	240	3,069	20	153	307
Average (1980–1982)	1,414,667	707,333	240	2,947	20	147	295

SOURCES: Marin County, Dutra Materials

- Conditions of approval for ARP82 include a provision that all increases in production above 1982 levels would be shipped by barge. However, none of the Quarry's permits in effect in 1982 or since have restricted production levels.
- While there are no known records of the number of truck trips associated with Quarry operations in 1982, the Marin County Planning Department estimates that the number of truck trips in 1981 was an average of 272 per day, and in 1982 307 per day.⁸ Using the same methodology used to derive these figures, the 1980 average number of truck trips per day was 306, and the average for the period 1980–1982 was 295 (Table 3-8) (a “truck trip” is each trip, empty or loaded, into or out of the Quarry property – i.e., a “round trip” is two truck trips).
- The original, 1976 Reclamation Plan, which was not approved by the County, but which was later incorporated by the applicant into the 1982 Amended Reclamation Plan, states that waste material from Quarry operations will either be exported to off-site fill projects or deposited at the bottom of deep pits.
- The 1982 ARP states that noise-generating operations are generally limited to daylight hours on weekdays, except in times of emergency.
- A noise study commissioned by the Quarry and completed in April, 1982 (Charles M. Salter Assoc., 1982) measured noise using short-term noise measurements taken from the vicinity of the homes on San Marino Drive (then the closest homes to the Quarry). Measurements were taken both during a period when Quarry operations were occurring and another period during the lunch break when there were no active quarrying operations. The sampling locations were behind the homes on San Marino Drive, that is, outside and facing

⁸ These figures were derived by assuming that half of the Quarry's annual production was shipped by truck, the other half by barge; that the Quarry operated 240 days per year, and that the average truck load was 20 tons.

the Quarry. The study found that noise from fog horn blasts dominated the noise environment; that sounds from McNear's Brickyard dominated the background at 44-50 dBA, and "...that in general the noise from the Basalt operation was inaudible. The one exception was that the backup beeper of a loader operating on the stockpile behind the secondary crushing operations was faintly audible at one point" (ibid, p. 2). The study concludes that an "Leq of 48 dBA represents the existing typical daytime background noise level for the homes on San Marino Drive" (ibid, p. 2). Noise measurements were also taken at the Quarry plant itself on two occasions. The measured noise levels for various pieces of major equipment were as follows:

Equipment	dBA at 100 Feet
Primary crusher	78
Secondary crusher	83
Caterpillar 988B front-end loader	80
Asphalt batch plant	79
Rock breaker (used occasionally at the bottom of the pit)	90

- The same noise study notes that "Blasting at McNear's Quarry takes place approximately two times a week" (Charles M. Salter Assoc., 1982, p. 4). The noise study references a vibration study by an "independent consultant" in 1980 at a home on San Marino Drive that indicates that "...vibrations generated by blasts range from 'imperceptible' to 'barely perceptible' and are below human annoyance levels" (ibid, p. 4). The original 1980 vibration study could not be located for this analysis.

Little else is known regarding the operations at the Quarry in 1982. Air photos of the Quarry and its surroundings in 1982 and in 2005 are shown in Figures 3-4a, 3-4b, and 3-4c.

3.5.2 Conditions of the 1972 Surface Mining and Quarrying Permit

The Quarry's 1972 Surface Mining and Quarrying Permit (County of Marin, 1972) grants permission to Basalt Rock Company, Inc. to "operate the existing Quarry on Assessor's Parcel No. 184-010-11, on Point San Pedro," and stipulates that "all work [is] to be done in accordance with plans entitled 'Photo Map, McNear Plant, San Rafael, California, prepared for Basalt Rock Company,' dated Oct. 28, 1971." The permit allows quarrying only within the areas shown on the map. General Conditions of the 1972 Surface Mining and Quarrying Permit are as follows:

1. This permit is issued pursuant to Marin County Code Section 23.06.
2. Acceptance of Provisions: It is understood and agreed by the Permittee that the doing of any work under this permit shall constitute an acceptance of the provisions.
3. No Precedent Established: This permit is granted with the understanding that this action is not to be considered as establishing any precedent on the question of the expedience of permitting this type of work or any other quarrying or strip mining.

4. Keep Permit on the Work: This permit shall be kept at the site of the work and must be shown to any representative of the Department of Public Works or any law enforcement officer on request.
5. Other Permits: The Permittee shall, whenever the same is required by any law, secure an encroachment permit, dam permit or any other permit required by any public board having jurisdiction, and this permit shall not be considered in operation unless and until such permit is obtained.
6. Erosion: All slopes are to be protected from erosion.
7. Compaction: Fills shall be compacted to a minimum of 90% relative compaction except as otherwise specified [no other specifications are listed].
8. Drainage: If the work herein contemplated shall interfere with the established drainage, ample provision shall be made by the Permittee to provide for it as may be directed by the Department of Public Works.
9. Rain: During periods of rain, operations shall be so conducted as to keep a minimum of disturbed area open at any time; check dams, diversion ditches, flumes, energy dissipaters or other devices shall be constructed and maintained as necessary and required by the Department of Public Works.
10. Cleanup: The Permittee agrees to promptly clean and maintain the pavement if excavated material is dropped or deposited on any roads or other areas.
11. Dust Control: The Permittee shall employ such measures to keep the dust nuisance to a minimum and at the request of the Department of Public Works he will water the working area to reduce the amount of dust when it is excessive.
12. Other Plans: By approving this permit, the County of Marin Department of Public Works does not imply approval of any improvement plans, grading plans, drainage plans, or engineered fill to be undertaken unless specifically stated herein as being approved.
13. Liability for Damages: The Permittee is responsible for all liability for personal injury or property damage which may arise out of work herein permitted or which may arise out of failure on the Permittee's part to perform his obligations under this permit in respect to maintenance. In the event any claim of such liability is made against the County of Marin or any department officer or employee thereof, Permittee shall defend, indemnify and hold them harmless from such claim.
14. Changes: The Department of Public Works reserves the right to amend, change, or remove said conditions of permit as issued during the life of said permit due to unforeseen or overlooked conditions, said amended conditions to have the same force and effect as the original conditions.
15. Restoration: The provisions in Marin County Code Section 23.06 are intended to insure that all areas of land affected by such operations shall be rehabilitated or restored to as nearly a natural appearance as possible, and to be compatible with surrounding property.

16. Overburden: All overburden shall be disposed of in a manner acceptable to the Department of Public Works, at both on-site and off-site disposal areas.

(County of Marin, 1972)

3.5.3 Conditions of the 1982 Amended Reclamation Plan Pertaining to Operations

The Marin County Planning Commission approved the 1982 Amended Reclamation Plan (Norman T. Gilroy and Associates, 1982) for the McNears Quarry (then owned by the Basalt Products Division of Dillingham Construction Co., SRRQ's predecessor in interest) with several conditions that relate to Quarry operations, and which therefore should also be considered a part of the baseline permit conditions for Quarry operations. These conditions were identified as mitigation measures in the Mitigated Negative Declaration adopted by the Commission prior to consideration of the Amended Reclamation Plan (County of Marin, 1982a). The conditions attached to the Amended Reclamation Plan are presented below. The first, second, and third conditions pertain to site reclamation. The remaining conditions, numbered 4-6, pertain to Quarry operations.

Conditions Pertaining to Site Reclamation:

1. The Quarry's operator must annually provide a topographic map and accompanying report to the Department of Public Works for monitoring conformance with the proposed Reclamation Plan;
2. Three years prior to completion of quarrying operations, specific cleanup measures to be undertaken prior to completion of mining are to be defined by the Quarry, the County, and City of San Rafael staff. Measures shall include a detailed landscape plan, with procedures and specifications for revegetation of selected areas, submitted to the County Department of Public Works;
3. The reclamation plan does not constitute the Master Plan of Development for the site. It indicates general land uses and includes intention to provide shoreline access when development occurs. Conformance with BCDC [Bay Conservation and Development Commission] will be accomplished when quarrying is exhausted and development of the site is proposed. The Master Plan for Development shall fully conform with all applicable BCDC plans and policies.

Conditions Pertaining to Operations:

4. The Quarry's operator must provide a line-of-site visual and noise buffer between the processing plant and homes on San Marino Drive by:
 - a. Retaining the existing stockpiles then located north of the main plant;
 - b. Maintaining a high lip along the North Ridge between the Main Quarry Bowl and the Brick Resource Area in the NE Quadrant;
5. The Quarry must shield lights in the main plant area to minimize glare at adjacent home sites;

6. The Quarry must use barge transport to accommodate shipment of any increases in extracted material above 1982 volumes and tonnages.

3.5.4 Project Objectives for the Amended Surface Mining and Quarrying Permit

SRRQ has stated the following as their objectives for the Amended Surface Mining and Quarrying Permit project:

1. Continue to operate a facility capable of meeting requirements for rock, aggregate, asphalt, and other materials for public works and private construction projects in Marin County and the San Francisco Bay region, the Sacramento/San Joaquin River Delta, and beyond;
2. Reduce truck traffic into Marin County by maintaining a local source of these materials, and by maintaining a facility that is capable of delivering materials by barge;
3. Maintain operations capable of producing and rapidly delivering, by barge and truck, rip-rap, aggregate, and other materials necessary to respond to public emergencies in Marin County, the San Francisco Bay region, and the San Joaquin/Sacramento River Delta, and beyond;
4. Minimize visibility and noise of operations from the site by maintaining buffer areas and berms;
5. Adopt as permanent the operating conditions proposed by the project sponsor in its October 27, 2004 proposal for administrative review of operating conditions, consistent with the Superior Court's Orders of April 19, July 15, and August 9, 2004; and
6. Comply with the interim operating conditions established by the Superior Court's Orders of April 19, July 15, and August 9, 2004, pending adoption of permanent operating conditions that are economically viable.

(Locke, 2006)

3.5.5 San Rafael Rock Quarry's Proposal for Amendments to the Surface Mining and Quarrying Permit

SRRQ's proposed amendments to the Surface Mining and Quarrying Permit (Dutra Materials, 2004; Cornwell, 2006a, 2006b, 2006c, 2006d) closely mirror the interim operating conditions imposed by the Court in its April and July, 2004 Orders (Marin County Superior Court, 2004b, 2004c, and 2004d). Specifically, SRRQ proposes the following:

A. Mining Plan

- The Quarry's current plan is to continue quarrying⁹ for a period of approximately 17 years from the date of approval of the proposed 2004 Amended Reclamation Plan as detailed in that plan. This would restrict mining to the SE and SW Quadrants, maintain a portion of

⁹ SRRQ defines "quarrying" as "removal of rock which has value because of its physical characteristics" (Dutra Materials, 2004b).

South Hill, an average depth in the Main Quarry Bowl of approximately -350' MSL, and a maximum depth of -400' MSL at the bottom of the Main Quarry Bowl's sedimentation pond.

Main Quarry Bowl

- Average overall Quarry slope: 60 degrees;
- Face slopes: 75 degrees;
- Benches: 30' minimum at 90' vertical intervals;
- Minimum overall Factor of Safety at -350' MSL depth (flooded condition): seismic 1.15, static 1.50;
- Lip of the Main Quarry Bowl to be set at +10' MSL; and
- New haul road to be developed intersecting with +10MSL elevation on the south rim.

South Hill

- Average overall Quarry slope: 60 degrees;
- Face slopes: 75 degrees;
- Benches: 60' minimum at 45' vertical intervals;
- Minimum overall Factor of Safety: seismic 1.15, static 1.50; and
- Benches to be developed at the following elevations: +165' MSL, +120' MSL, and +30' MSL.

B. Hours of Operation (see Table 3-9)

1. Crushing Plant

The crushing plant is made up of an initial hopper that receives the rock for crushing, jaws which crush the rock, screens where it is separated by size, and conveyors which transport it to product stockpiles. Proposed hours and days of operation of the crushing plant are as follows:

- a. December 1 through April 30, 7:00 a.m. to 5:00 p.m., Monday through Friday, except operation may continue until 10 p.m. for up to 30 calendar days during this period.
- b. May 1 through November 30, 7:00 a.m. to 10:00 p.m., Monday through Friday.
- c. No operation on Saturdays or Sundays.

2. Maintenance Activities

Maintenance activities are proposed to occur Monday-Friday 7 a.m. to 5 p.m. and on up to 15 Saturdays per year, 7:00 a.m. to 5:00 p.m. No maintenance activities would take place on Sundays. "Maintenance activities" is defined to include the repair, replacement, and failure

**TABLE 3-9
PROPOSED HOURS OF OPERATION**

Activity	Monday-Friday	Saturday, Sunday, Holidays	Declared Public Emergencies
Crushing Plant	December 1 – April 30: 7:00 a.m. to 5:00 p.m.; 7:00 a.m. to 10 p.m. on up to 30 calendar days during this period May 1-November 30: 7:00 a.m. to 10:00 p.m.	None.	Restrictions suspended
Maintenance Activities	7:00 a.m. to 5:00 p.m.	Up to 15 Saturdays per year, 7:00 a.m. to 5:00 p.m.	Restrictions suspended
Barge Operation or Loading	7:00 a.m. to 10:00 p.m.	7:00 a.m. to 10:00 p.m.	Restrictions suspended
Truck Access at SRRQ Gate	7:00 a.m. to 5:00 p.m.	No trucks hauling mineral resources	Restrictions suspended
Blasting	11:30 a.m. to 1:30 p.m., with 36 hours advance notification	None	Restrictions suspended
Other mining activities, including drilling, materials handling and transport, etc., other than blasting	7:00 a.m. to 10:00 p.m.	7:00 a.m. to 10:00 p.m.	Restrictions suspended
Office operations	7:00 a.m. to 5:00 p.m.	None	Not specified

preventative measures on facilities, fixed plants, spring lines, vehicles, vessels, and stationary and mobile equipment at SRRQ.

Maintenance activities specific to the Crushing Plant include corrosion protection, welding, metal cutting, replacement of worn parts, removal of obsolete facilities, repair of various mechanical devices, and the use of normal maintenance vehicles including lube trucks, high lifts, fork lifts, front-end loaders, cranes, and other construction equipment.

Vessels subject to maintenance activities include barges and tugs, as well as smaller watercraft used to transport crews, equipment, and aggregate products. Vessels require maintenance similar to other large equipment operated by the Quarry. Normal maintenance requires the use of hand tools, refueling, adding or changing fluids, adjusting motors and controls, and similar minor maintenance. Major maintenance of vessels may require welding equipment, hydraulic lifts, small cranes and other supporting equipment.

3. Barge Loading Operation

The barge loading operation is separate from the crushing plant. The equipment used for the barge loading operation includes a hopper and conveyor which allow the product to be loaded on land and distributed to the barge by conveyor. Since not all barges are able to accommodate a conveyor-type loading system, SRRQ drives trucks onto some barges and dumps the aggregate

directly onto the barge from the trucks. Proposed hours for barge loading operations are as follows:

7 days per week, 7:00 a.m. to 10:00 p.m.

4. Office Operations

The Quarry's business office currently operates weekdays from 7 a.m. to 5 p.m. No change is anticipated.

5. Public, Contractor, or Commercial Truck Access to Quarry (SRRQ Gate)

- a. Gates open at 7:00 a.m.
- b. Trucks transporting mineral resource enter and leave the Quarry between 7:00 a.m. and 5:00 p.m., Monday through Friday, and there are no truck trips on Saturday, Sunday, or federal or state holidays.

6. Weather Restrictions

Excavation, grading, hauling, and/or unloading soil, rock (except within the Main Quarry Bowl), and overburden shall be suspended when instantaneous wind gusts exceed 25 mph as measured at the top of the Main Quarry Bowl.

7. Emergency Operations

Crushing plant, barge operations, contractor and commercial truck access, and maintenance activities may occur 24 hours per day, 7 days per week, and limitations on truck trips will be suspended, during officially declared public emergencies. A public emergency, as defined by the Marin County Superior Court (Marin County Superior Court, 2004d), exists only when there is a need to prevent or respond to a landslide, levee failure, structural failure, or other imminent harm from an earthquake, flood, or other natural disaster, and when the emergency has been declared by an authorized local, state, or federal government agency.

C. Truck Traffic

1. Route Restriction

Quarry truck traffic shall not use North San Pedro Road.

2. Truck Trips

Truck trips are limited to a maximum of 250 one-way trips (125 round trips) per day with an approximate load capacity of 25 tons.¹⁰ This restriction applies to trucks for the transport of quarry resources including asphalt. This restriction does not apply to McNear's Brickyard operations.

¹⁰ Gross vehicle weight of trucks on California highways is limited to 80,000 pounds, or 40 tons.

3. Truck Spacing

Trucks transporting quarry materials leaving the property shall be metered such that departures are spaced at 2-minute intervals during peak traffic periods. Peak traffic periods are 7:30 a.m. to 8:30 a.m. and 12:00 noon to 1:00 p.m.

D. Blasting

1. Hours and Days

Blasting will be limited to the hours of 11:30 a.m. to 1:30 p.m., Monday through Friday. No blasting to occur on State holidays or weekends. Currently, State holidays include the following:

- New Year's Day
- Martin Luther King Jr. Day
- Lincoln's Birthday
- Washington's Birthday
- Cesar Chavez Day
- Memorial Day
- Independence Day
- Labor Day
- Columbus Day
- Veterans Day
- Thanksgiving Day (and the day after)
- Christmas Day

2. Notification

The Quarry shall provide 36 hours advance notification of blasting to local residents and the County of Marin by posting the date and approximate time of scheduled blasts on a web site.

3. Vibration

Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.5 inches per second.

E. Noise

1. Limits

As measured at the Quarry property boundary, noise shall not exceed 60 dBA L_{dn} (day/night weighted average) and 70dBA L_{max} (instantaneous level using the “slow” response setting of the sound level meter).

2. Best Management Practices

The Quarry shall implement best management practices to reduce or maintain noise at or below limits, in compliance with state and federal laws.

F. Dust Control

1. Trucks

All quarry product transport trucks leaving the Quarry shall be washed down, including the undercarriage, prior to entering Point San Pedro Road. The wash down and adjoining areas shall be paved to minimize tracking of dust and dirt (a new truck wash system was installed in 2005). Point San Pedro Road will be swept up to two times per day, except on rain days, when no sweeping will occur, subject to approval of the City of San Rafael.

2. Erosion Control

The Quarry shall maintain all required erosion control measures and stormwater management plans, and shall keep current and comply with all permits required by the Regional Water Quality Control Board.

3. Equipment

The Quarry shall maintain all dust abatement devices, and shall keep current and comply with all permits required by the Bay Area Air Quality Management District.

G. Visual

1. Buffer

Existing stockpiles located north of the plant will be continually modified, but will remain to provide line-of-sight visual and noise buffers between the plant operation and residences on San Marino Drive, unless replaced by another berm to provide a visual and noise buffer.¹¹ Elevated or raised topography shall be maintained between the Main Quarry Bowl and the northern property line until the time of reclamation.

2. Lighting

Lights in the main plant area shall be shielded to minimize glare to adjacent residential properties.

H. Product Washing

The Quarry no longer produces a washed product, and does not intend to in the future. Therefore, there will be no washing of rock, and no resultant production of pond fines.

¹¹ SRRQ proposes as part of its Amended Reclamation Plan to construct a temporary berm on the north end of the property, in the NE Quadrant.

3.5.6 Comparison of the San Rafael Rock Quarry Proposal for the Amended Surface Mining and Quarrying Permit with Existing Conditions

Because of the lack of detailed information available on the scope of the Quarry's use of the property as of 1982, comparing SRRQ's proposed amendments to the Surface Mining and Quarrying Permit with the currently permitted use is not a straightforward undertaking. Using the outline of SRRQ's proposal presented above as a starting point, Table 3-10 provides the elements of the project to be evaluated in the EIR that is, those proposed activities that differ from or exceed the scope of the Quarry's permitted use of the property. In the EIR, the potential impacts of the project elements are evaluated within the context of the physical environment at the time that the NOP was issued in 2007.

In addition to proposed operational changes at the San Rafael Rock Quarry itself, this EIR also examines the potential for off-site impacts of the proposed project. These may occur where reasonably foreseeable future off-site activities associated with Quarry operations under the proposed AQP would be different from the off-site activities linked to the baseline activities of the Quarry. Of particular note in this regard is the potential linkage between SRRQ operations and those at the proposed Haystack Landing asphalt batching facility just south of Petaluma, another project proposed by Dutra Materials, the parent company of SRRQ. The proposal for the Haystack Landing facility includes an increase in allowable barge trips entering the facility, from the 25 currently allowed per year at Dutra Material's existing Petaluma facility, to 125 trips per year; it can be expected that many of these barge trips will originate from SRRQ.

Sonoma County is currently preparing an EIR for the proposed Haystack Landing facility. Site-specific issues, including traffic and air quality issues that may be associated with increased barge traffic, are examined in that EIR. This EIR considers potential cumulative effects of the ARP and AQP, combined with the Haystack Landing facility and other off-site projects.

3.6 Administrative Actions and Next Steps in the Project Review Process for Both Projects

Project approval requires the Lead Agency (and Responsible Agencies) to approve the project or project components, issue required permits, or affirm compliance with agency requirements. The County of Marin is the Lead Agency for the SRRQ ARP and AQP projects. A Lead Agency, as defined in Section 15367 of the CEQA *Guidelines*, is “the public agency that has the principal responsibility for carrying out or approving a project.” Described below are the discretionary actions being sought by the project sponsor for ARP04 that the County will consider during its review. The County of Marin project planning and approval process involves two main steps and, at key times during this process, the public may comment on various aspects of the project. The two main steps in the County's review process are: (1) circulation and certification of the EIR and findings of the EIR; and (2) approval, conditional approval (requiring that certain changes be

**TABLE 3-10
PROJECT ELEMENTS**

Element	Baseline – existing permit condition or scope of permitted use	Proposed amendment to the Surface Mining and Quarrying Permit	Difference or Divergence
Extent of mining operation	Hard rock mining restricted to the SE and SW Quadrants, maximum depth of Main Quarry Bowl 200', mining of South Hill per ARP82.	Hard rock mining restricted to the SE and SW Quadrants, maximum depth of Main Quarry Bowl 400', mining of South Hill per ARP04.	Increased depth of mining in the Main Quarry Bowl. Minor changes to the final grades of quarried portions of South Hill and North Hill.
Remaining life of Quarry	ARP82 estimated remaining life of the Quarry would be through approximately 1994.	Approximately 17 years from approval of proposed 2004 ARP, estimated to be 2024.	Quarry would be in operation for 30 years longer, approximately, than estimated in ARP82. ^a
Crushing plant operations	In 1982, the Quarry operated two crushing/washing/ screening plants and planned to construct a third plant. ARP82 states that noise generating operations (presumably including the crushing plant) are generally limited to daylight hours on weekdays, except in case of emergencies.	Crushing plant operations have changed little since 1982. SRRQ proposes restrictions on hours and days of operation.	There is little difference in crushing plant operations between permitted and proposed, other than specific restrictions on hours and days of operation. SRRQ proposes to operate the crushing plant until 10 p.m.
Barge operation and loading	No restrictions or conditions were placed on barge loading operations in 1982. Conditions of approval for ARP82 included use of barges for transporting any increase in product. ARP82 states that noise generating operations (presumably including barge loading) are generally limited to daylight hours on weekdays, except in case of emergencies	Barge loading operations have changed little since 1982. SRRQ proposes restrictions on hours of operation.	There is little difference in barge loading operations between permitted and proposed, other than restrictions on hours of operation. SRRQ proposes to conduct barge loading operations up to 10 p.m.
Public, contractor, and commercial truck access to the Quarry	There is no information available on hours or days that the Quarry gate was open and the Quarry was accessible in 1982. ARP82 states that noise generating operations (presumably including heavy trucks entering and leaving the facility) are generally limited to daylight hours on weekdays, except in case of emergencies.	SRRQ proposes to limit time and days of access to the facility.	Proposed access is more specific and limited than permitted access.
Operating during adverse weather	Condition 9 of the 1972 SMQP states that during periods of rain, operations shall be so conducted as to keep a minimum of disturbed area open at any time, and to construct and maintain a storm water system. Condition 6 requires erosion protection for all slopes.	SRRQ proposes to suspend excavation, grading, hauling, and loading of soil and rock, except within the Main Quarry Bowl, when wind gusts exceed 25 mph, and to maintain all required erosion control and measures and stormwater management plans.	Proposed restrictions on operation during adverse weather are more limited than permitted operations.
Emergency Operations	ARP82 suggests (page 9) that hours of operation may be extended during times of emergency.	SRRQ proposes suspension of limits on hours and days of operation during declared public emergencies, as defined.	No effective change in emergency operations.
Truck Traffic	Truck traffic in 1982 is estimated at 307 trips per day with an average load capacity of 20 tons, without restriction in regards to time of day or days of the week, and not including trucks related to McNear's Brick operations. ARP82 conditions of approval require any increase in production above 1982 levels to be shipped by barge. ARP82 states that noise generating operations (presumably including heavy trucks entering and leaving the facility) are generally limited to daylight hours on weekdays, except in case of emergencies.	SRRQ proposes to limit truck traffic to 250 trips per day with a load capacity of approximately 25 tons. Hours and days that trucks may leave the property are limited. Trucks leaving the property will be metered during peak periods, and traffic will be restricted from using North San Pedro Road. Limits on truck traffic do not apply to traffic related to McNear's Brick operations.	SRRQ's proposal represents a decrease in the number of heavy truck trips relative to current permit restrictions. Proposed hours, days, and metering of loaded trucks leaving the facility are more restrictive than permitted.
Blasting	None of the permit conditions pertain to blasting. ARP82 states that noise generating operations (presumably including blasting) are generally limited to daylight hours on weekdays, except in case of emergencies. A 1982 noise study notes that blasting occurred approximately two times a week, and cites a study that concluded that vibrations from blasting on San Marino Drive were below human annoyance levels.	SRRQ proposes to limit the days and hours when blasting could occur, to provide advance notification of planned blasts to local residents and the County, and to limit ground vibration from blasting at and beyond the property boundary.	The proposed limits on ground vibration at and beyond the property boundary would result in vibrations that are more perceivable by more people than was occurring in 1982.
Noise from Quarry Operations	ARP82 states that noise generating operations are generally limited to daylight hours on weekdays, except in case of emergencies. A noise study completed in 1982 concludes that the background noise levels during Quarry operations at the houses on San Marino Drive was Leq 48 dBA. The study also includes noise levels for Quarry machinery operating at that time.	SRRQ proposes to limit noise as measured at the property boundary, to define hours of operation, and to maintain best management practices to reduce noise.	Proposed hours of operation would result in noise-generating activities occurring during times other than daylight hours on weekdays.
Dust Control	Conditions of the 1972 Surface Mining and Quarrying Permit require the Quarry to protect slopes from erosion, compact slopes, and control dust, including prompt cleaning of roadways if a spill occurs, and keeping the dust nuisance to a minimum.	SRRQ proposes washing down trucks prior to leaving the property, sweeping Point San Pedro Road regularly, maintaining erosion control measures, and maintaining dust abatement devices on equipment. SRRQ proposes to suspend excavation, grading, hauling and/or unloading soil and rock, except within the Main Quarry Bowl, when instantaneous wind gusts exceed 25 mph as measured at the top of the Main Quarry Bowl.	Proposed dust control measures are more specific and more stringent than those specified in current permit conditions.
Visual Buffers	Conditions of approval of ARP82 and ARP82 itself specify maintenance of stockpiles north of the Main Quarry Bowl, preservation of a portion of South Hill, and limited use of the NE Quadrant to minimize and shield visual effects.	SRRQ proposes to maintain existing stockpiles north of the plant to provide line-of-sight buffers. ^b	No change between permitted and proposed.
Lighting	Conditions of approval for ARP82 include a similar requirement to shield lights.	SRRQ proposes to shield lights in the main plant area to minimize glare.	No specific changes between permitted and proposed; however, proposed nighttime operations would require lighting.
Level of Operations	The average level of production for the period 1980-1982 was 1,414,667 tons per year.	No limit is proposed on the level of output of the Quarry.	The lack of a proposed limit would enable the Quarry to exceed annual production levels from the period 1980-1982.
Sensitive Receptors	The closest sensitive receptors to the Quarry in 1982 were the homes on San Marino Drive.	Since 1982, new homes have been built on Marin Bay Park Court and on Heritage Drive, both in closer proximity to the Quarry than San Marino Drive. In addition, since 1982 McNear's Beach County Park was opened.	There are now sensitive receptors in closer proximity to the Quarry than in 1982.

^a The Marin County Superior Court Order states that the Quarry has a right to continue mining "without regard to depth or duration" of the operation; therefore, the Quarry could in the future, within the scope of its vested use, submit another application for amending its Amended Reclamation Plan and perhaps its Surface Mining and Quarrying Permit to enable quarrying to a greater depth and for a longer period of time. As the Quarry is not presently proposing this, it is considered speculative and beyond the scope of environmental review under CEQA.

^b In SRRQ's proposed Amended Reclamation Plan (ARP04), the Quarry states their intention to construct a new berm between the Main Quarry Bowl and the northern property line. This feature is evaluated in the EIR for ARP04.

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made or conditions be met), or denial of the projects. The following procedures and actions must be taken in order to approve the projects. The procedures are listed in sequential order:

- The Draft EIR ~~will~~ was be circulated for public review and comment, as described in Chapter 1.
- Marin County Board of Supervisors ~~will hold~~ held a public hearing at which time individuals ~~may~~ commented on the adequacy of the Draft EIR. The Final EIR, consisting of all comments received on the Draft EIR together with responses to those comments and necessary changes to the EIR text will be circulated for ~~two weeks~~ 45 days, as described in Chapter 1.
- The Marin County Board of Supervisors will hold a public meeting at which it will consider the adequacy of the Final EIR, including review of written comments on the adequacy of the Final EIR's response to comments on the Draft EIR. Based on their consideration of the Final EIR's adequacy, the Board of Supervisors will decide whether to certify the Final EIR.
- After certification of the Final EIR, the Board of Supervisors will then consider the merits of the ARP and the AQP in one or more a public hearings, at which time the public can comment on the merits of the projects and on the applications for project approval. The Board will approve, give conditional approval, or deny the ARP and AQP in separate actions. Pursuant to SMARA § 2770, Board of Supervisors approval of the ARP may be appealed to the State Mining and Geology Board.
- Improvement plans (e.g., grading plans for each reclamation phase) will be filed with the County prior to implementation. Approvals of the plans are administrative actions by County staff. At this stage, the following approvals will be made:
 - Grading Permit: The Marin County Public Works Department has the authority to issue a grading permit for projects that artificially move over 250 cubic yards of earth in Marin County.
 - Fire Protection and Preparedness Plan: The Marin County Fire Marshal has discretionary authority to approve a fire protection and preparedness plan.
 - Construction Permits: The Marin County Building & Safety Division has the authority to issue Building, Electrical, Mechanical, and Plumbing Permits for improvements that involve those types of construction activities.

After approval of the AQP and ARP, County staff can administratively issue grading and building permits. When applications are received by the County for necessary permits, staff members review the applications for conformance with provisions (or conditions) of approved plans and specific County Code requirements. Building permit applications are checked by the Community Development Agency and grading permits by the Department of Public Works before issuance of the permit. During construction, specific inspections are required throughout the construction process.

3.7 California Environmental Quality Act Responsible Agency Actions, Federal Agency Actions, and Trustee Agencies

In addition to the Lead Agency, a number of other agencies will have discretionary approvals related to the project. “Responsible agencies” includes “all local and state public agencies other than the lead agency that have discretionary approval power over the project (CEQA *Guidelines* §15381). In addition, certain Federal agencies have permit authority over project activities. A trustee agency is a “state agency having jurisdiction by law over resources affected by the project which are held in trust for the people of the State of California” (State CEQA *Guidelines* §15386). Several of the responsible, Federal, and State trustee agencies for ARP and AQP and their related areas of review/discretionary authority are described below. A more complete list appears in Table 3-1.

3.7.1 Federal Agencies

U.S. Army Corps of Engineers (USACE)

Under Section 404 of the Clean Water Act, the USACE regulates discharges of dredged or fill material in waters of the United States, and adjacent wetlands. If there are any jurisdictional wetlands that would be filled, or if it is determined that reclamation activities would affect the shoreline of the property, the project would require a Section 404 authorization from the USACE.

U.S. Fish and Wildlife Service (USFWS)

If either project may affect federally-protected wildlife species and/or associated protected habitats (e.g. nesting or roosting areas, migration corridors) which fall under USFWS jurisdiction, it could require a federal Endangered Species Act Incidental Take Permit. The USFWS would comment on the USACE permits to recommend actions that avoid or mitigate such disturbance.

National Marine Fisheries Service (NMFS)

If either project may affect federally-protected marine wildlife species and/or associated protected habitats which fall under NMFS jurisdiction, it could require a federal Endangered Species Act Incidental Take Permit. NMFS would comment on the USACE permits to recommend actions that avoid or mitigate such disturbance.

3.7.2 State and Local Responsible and Trustee Agencies

California Department of Fish and Game (CDFG)

The projects may affect fish and wildlife under the jurisdiction of CDFG as a trustee agency and may require a California Endangered Species Act Incidental Take Permit. In addition, if either project would substantially alter a stream, it may require a CDFG Section 1600 Streambed

Authorization Agreement. CDFG would comment on the EIR and on the USACE permits to seek actions that avoid or mitigate impacts to resources under its jurisdiction.

Bay Conservation and Development Commission (BCDC)

The BCDC is a trustee agency. The projects may require SRRQ to obtain a Major Permit prior to undertaking any of the following activities:

- **Filling** Placing solid material, building pile-supported or cantilevered structures, disposing of material or permanently mooring vessels in the Bay or in certain tributaries of the Bay.
- **Dredging** Extracting material from the Bay bottom.
- **Shoreline Projects** Nearly all work, including grading, on the land within 100 feet of the Bay shoreline.
- **Other Projects** Any filling, new construction, major remodeling, substantial change in use, and many land subdivisions in the Bay, along the shoreline, in salt ponds, duck hunting preserves or other managed wetlands adjacent to the Bay.
- **Federal Projects** In addition to carrying out its regulatory authority under state law, the federal Coastal Zone Management Act gives the BCDC the authority to review federal projects and projects that require federal approval or are supported with federal funds.

Marin Municipal Water District

The Marin Municipal Water District has discretionary authority and responsibility for provision of potable water service, and service connections to new uses. Proposed use and connection to service facilities would require approval from the District.

State Lands Commission (SLC)

The SLC is a trustee agency. The SLC was created by the California Legislature in 1938 and given the authority and responsibility to manage and protect important natural and cultural resources on certain public lands in the state and the public's right to access these lands. The SLC has jurisdiction over sovereign lands, which include navigable rivers, lakes and streams, and tide and submerged lands along the coastline of California extending from the shoreline to three miles offshore. The project would result in creation of new tidelands and may also affect existing tidelands within the purview of the State Lands Commission. Certain excavation activities, including cutting of the channel to the Bay, may involve extraction of mineral resources from tidelands. Therefore, SRRQ may need to acquire a SLC non-prejudicial lease or permit for the project.

Bay Area Air Quality Management District (BAAQMD)

The BAAQMD has jurisdiction over regional air quality issues, and could require new or revised Authority to Construct and Permission to Operate (PTO) permits. The BAAQMD typically reissues PTOs annually.

3.8 Distinction between Review of Environmental Issues and Project Merits

Often during review of an EIR, the public raises issues that relate to the project itself or the project's community benefits or consequences (referred to here as “project merits”), rather than the environmental analyses or impacts raised in the EIR. Lead Agency review of environmental issues and project merits are both important in the decision of what action to take on a project, and both are considered in the decision-making process for a project. However, a Lead Agency in its CEQA review is required only to address environmental issues that are raised. Certifying an EIR (i.e., finding that it was completed in compliance with CEQA) and taking action on the project are procedurally distinct processes and result in separate decisions made by the Lead Agency.

References – Project Description

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CHAPTER 4

Environmental Setting, Impacts, and Mitigation Measures

4.1 Aesthetics

This section analyzes the potential impacts that both of the proposed projects would have on visual quality in the project vicinity. The aesthetics evaluation focuses on physical changes at the Quarry site associated with the proposed Amended Reclamation Plan (ARP) and Amended Surface Mining and Quarrying Permit (AQP), including the construction of berms and creation of overburden and topsoil stockpiles while quarrying continues (during all reclamation grading phases of the ARP), the removal of site structures, and the proposed final configuration of the site at the conclusion of the reclamation period. This section also discusses the aesthetic effects of light and glare associated with nighttime ARP and AQP activities. The section presents existing views of the site from a range of vantage points as well as simulations of future views from the same vantage points under project conditions.

Setting

Visual Character of the Region and Project Vicinity

The project site is located at the eastern end of the peninsula that divides San Pablo Bay from San Rafael and San Francisco Bays. San Pablo Strait, which connects San Pablo and San Francisco Bays, extends between this peninsula and Pt. San Pablo, within the City of Richmond in Contra Costa County, on the east side of the strait (as shown in Figure 3-1 in Chapter 3, Project Description). The site is essentially surrounded on three sides by water. The hills of the peninsula's interior rise above the project site to the north and northwest. Adjacent to the site to the north is the Peacock Gap Neighborhood, a suburban residential neighborhood characterized by wooded hillsides with single family homes and condominiums and, in a bowl in the interior of the neighborhood, an 18-hole golf course. McNear's Beach County Park is adjacent to the site on the northeastern edge of the peninsula. A wooded ridge separates the County Park from the Quarry site. Northwest and upland of the Peacock Gap Neighborhood are the grass, chaparral, and oak-covered hills of China Camp State Park. Northeast, east and south of the site lie the expansive San Pablo and San Francisco Bays. San Rafael Bay is immediately south of the site along the southeastern shore of the peninsula. The visual character of the site is shaped by this combination of wooded suburban hills, undeveloped open space in the higher hills, and the open Bay waters northeast and south of the site.

The Quarry site itself is a large industrial site in the otherwise essentially suburban landscape. As described in the Project Description, the Quarry has been in operation for more than a century, and the residential neighborhood developed around it. Undeveloped marsh areas and process water ponds, a remaining knoll, and a line of trees are the closest features to Point San Pedro Road and Cantera Road which pass the site. The smokestacks and industrial buildings of the McNear's Brickyard are clearly visible from Point San Pedro Road and the public walkway¹ along San Rafael Bay, and contribute to the historic character of the site. The most highly disturbed part of the site—the actively quarried areas of the Main Quarry Bowl and south-southeastern flank of South Hill—are in the southern half of the site, on the far side of the ridge dividing the northern and southern quadrants from the Peacock Gap Neighborhood.

Currently, most quarry operations, including those in the Main Quarry Bowl and the plant area around the Main Quarry Bowl, cannot be seen from surrounding homes, roadways, or public vantage points. Operations that are visible include trucks and equipment entering and leaving the facility, quarrying operations on South Hill, and barge loading operations, which are visible from McNear's Beach County Park. Because these operations, including quarrying of South Hill, are consistent with San Rafael Rock Quarry's (SRRQ) existing entitlements, they are considered a part of the environmental baseline for the AQP project, and not a component of the proposed amendments to the Surface Mining and Quarrying Permit.

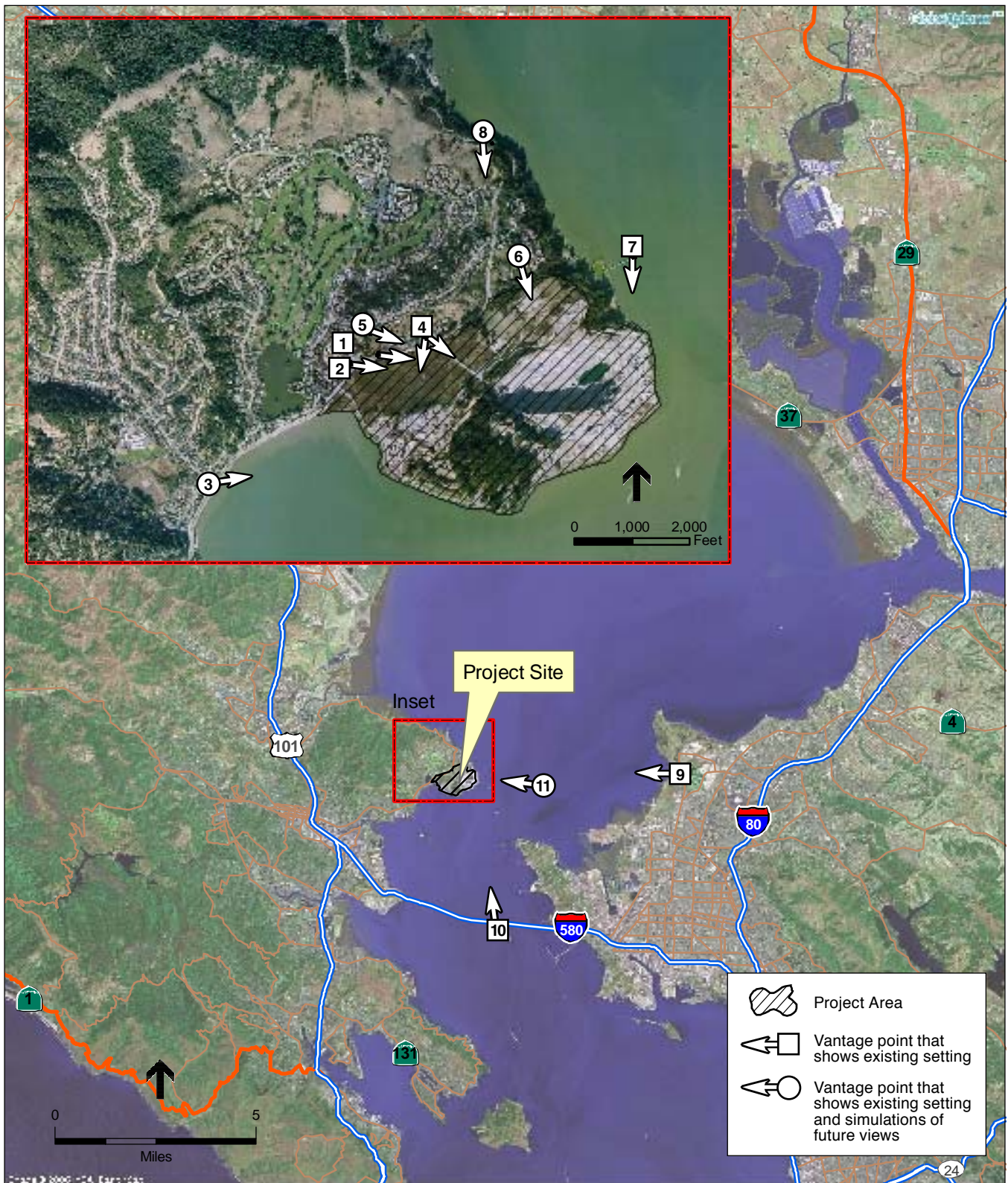
The plant area, barge dock and loading facilities, and the quarried slopes above the Main Quarry Bowl and on South Hill, are currently visible from the Bay and from more distant vantage points across the water. Some operations, particularly movement of trucks and equipment, are also visible from the water and over the water.

As stated in Chapter 3, Project Description, conditions of approval for the 1982 Amended Reclamation Plan require that existing stockpiles in the northern part of the site remain to provide line-of-sight visual and noise buffers between plant operations and residences on San Marino Drive, that elevated or raised topography be maintained between the Main Quarry Bowl and the northern property line until the time of reclamation, and that lights in the plant area be shaded to reduce glare.

Scenic Vistas, Public Views, and Significant Features

A map of the project site and vicinity, indicating vantage point locations, is presented in Figure 4.1-1. Existing views from these vantage points are discussed in this section. Simulations of future views under the proposed project were prepared for five of these vantage points, as indicated on the map; these future views are discussed in the Impacts and Mitigation Measures section, below.

¹ Although this public way between Point San Pedro Road and the water provides for pedestrian and bicycle travel and shoreline access, for simplicity it is referred to herein as a walkway.



SOURCES: ESA (2006), ESRI (2004), GlobeXplorer (2006)

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-1
Vantage Points Location Map

Views from the West and North

As viewed from various vantage points in the neighborhood and State parklands to the west and north, the marsh and pond areas of the site next to Point San Pedro Road, the Grassy Knoll and perimeter trees north of the marshes, and the wooded western slope of what remains of South Hill serve to visually shield industrial activities in the Northeast Quadrant (NE Quadrant) and the highly disturbed quarried areas in the southern half of the site. Figure 4.1-2 shows views of the site from Point San Pedro Road south of the site entrance and at the intersection of Point San Pedro Road and Chapel Cove Drive, Vantage Points 1 and 2, respectively. Figure 4.1-3 shows the existing view of the site from the public walkway/shoreline access that borders San Rafael Bay (Vantage Point 3). As shown, the marsh and pond area, wooded western flank of South Hill, and McNear's Brickyard are clearly visible from these perspectives, but little of San Francisco or San Pablo Bays or areas beyond are discernable from these low-elevation viewpoints; a portion of the Richmond-San Rafael Bridge can be seen from Vantage Point 2, however. The buildings and smokestacks of the McNear's Brickyard contribute to both the historic and industrial character of the site. Figure 4.1-4 shows two views of the site from Vantage Point 4 on Heritage Drive opposite the Quarry entrance: one view toward the entrance road and one south across the marsh toward the McNear's Brickyard. Residences and landscape vegetation tend to limit the field of view toward the site from this area. Figure 4.1-5 shows a view of the site from the end of Via Montebello off of San Marino Drive, Vantage Point 5. As shown in the top (daytime) photo, from this higher elevation a wider field of view is available, and more of the Bay, Richmond-San Rafael Bridge, and land area ringing the Bay can be seen on both sides of South Hill. The lower photo is the existing nighttime view from the same spot. In the nighttime photo the existence of South Hill can be inferred more than seen, from the interruption of distant urban lights on the horizon beyond. Lighting on the site itself seen from this vantage point is located primarily in the vicinity of McNear's Brickyard.

Figure 4.1-6 shows existing views of the site from the deck of a residence on Marin Bay Park Court (Vantage Point 6) and the end of the pier at McNear's Beach County Park (Vantage Point 7). The Marin Bay Park neighborhood, which is part of San Rafael's Peacock Gap Neighborhood, is the nearest residential area to the site. As shown in the top photograph in Figure 4.1-6, part of the mined area of South Hill can be seen in the right side of the frame from the residence; a portion of the Richmond-San Rafael Bridge and mountains beyond can also be seen, although much of the view – of the SRRQ site and beyond – is obscured by trees growing on both sides of Cantera Way (which can be seen through the trees, just above the deck railing, in the photograph). As shown in the lower photograph of this figure, part of the barge loading area and dock can be seen from the pier at McNear's Beach County park.

Figure 4.1-7 shows the view toward the Quarry site from Vantage Point 8 in China Camp State Park. From this vantage point, South Hill on the Quarry site is clearly visible, along with the Peacock Gap Neighborhood, in the foreground, and part of the Richmond San Rafael Bridge, in the background.



Vantage Point 1: View from Pt. San Pedro Road south of Quarry entrance

4.1-5



Vantage Point 2: View from intersection of Pt. San Pedro Road and Chapel Cove Drive



Vantage Point 3: View from public walkway south of site



Vantage Point 4: View from Heritage Drive toward site entrance



Vantage Point 4: View from Heritage Drive toward McNear's Brickyard

4.1-7



Vantage Point 5: View from Via Montebello near San Marino Drive

4.1-8



Vantage Point 5: Nighttime View

SOURCE: Field of Vision

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-5
Existing View from Vantage Point 5 –
Day and Nighttime Views



Vantage Point 6: View from residence on Marin Bay Park Court



Vantage Point 7: View from pier at McNear's Beach County Park

SOURCE: Field of Vision

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-6
Existing Views from
Vantage Points 6 and 7



Vantage Point 8: View from China Camp State Park

Views from the East and South

As discussed above, the site is also visible from areas to the east, in Contra Costa County. The site is large, approximately 0.6 miles across, and more than 100 years of quarrying activity has transformed the site as seen from the east. The highly altered, bare slopes are easily detected from substantial distances, contrasting with the vegetated slopes north and south of the site.

Figure 4.1-8 shows the view of the site from a public recreation field across the Bay, on Giant Highway just south of Point Pinole Regional Shoreline (Vantage Point 9). From this vantage point, while the Quarry is visible, it is too distant for specific features to be readily discerned. From the hillside residential areas in the cities of Richmond and San Pablo (not shown) the site is discernable in areas, although for the most part views of it are obscured by vegetation and intervening topographic features and structures. The upper floor of some two-story houses on the western edge of the Hilltop neighborhood west of Hilltop Mall may afford unobstructed views toward the site. However, because there is substantial development between this residential area and the Bay, the much nearer development would predominate over the Quarry in views to the west. Given the presence of intervening development, as well as intervening topography and vegetation, the Quarry site would only be a minor, distant feature within the field of view in this area. As shown in the lower photo of Figure 4.1-8, the site can also be seen from the Richmond – San Rafael Bridge. Given highway travel speeds and intervening bridge structures (rails and trestles), views of the site are temporary and intermittent. The view shown is from Vantage Point 10 on the eastern half of the bridge.

The site is also visible from the Vallejo commuter ferry and shipping traffic that pass the site, and recreational boaters, kayakers and other water craft users on the waters in the site vicinity.

Figure 4.1-9 presents daytime and nighttime views of the site from the Vallejo commuter ferry, Vantage Point 11. As shown in the daytime photograph, the long history of quarrying at the site is clearly reflected in the highly altered southern half of the SRRQ site that is visible from here. The quarrying of South Hill (on the left side of the photo) also can be seen from this vantage point. As shown in the nighttime photograph, the bright lights used for quarry operations after dark (much brighter than those seen from the northern/northwestern side of the site) are clearly visible from this view from the east.

The nearest residential area on the east side of San Pablo Bay is the small houseboat community at the Point San Pablo Yacht Harbor, on the peninsula across San Pablo Strait to the southeast. The view from this community (not shown) is very similar to the view from the ferry shown in Figure 4.1-9. The yacht harbor is approximately 2.5 miles east of the site and the view toward the Quarry is uninterrupted except for passing ships and other water craft.

Views of the site from land areas further south, on the Tiburon Peninsula, also were considered in preparation of this analysis. Although the site is discernable from various points on this peninsula, it is only barely so – a minor, distant component of the landscape. Because many other elements, including the Richmond-San Rafael Bridge and nearby land and water areas factor much more prominently in the visual environment, visual impacts of the project on this area are not considered further.



Vantage Point 9: View from recreation fields south of Point Pinole Regional Shoreline



Vantage Point 10: View from eastern half of Richmond–San Rafael Bridge

SOURCE: Field of Vision; ESA

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-8
Existing Views from
Vantage Points 9 and 10



Vantage Point 11: View from ferry, San Pablo Bay



Vantage Point 11: Nighttime View

SOURCE: Field of Vision

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-9
Existing View from Vantage Point 11 –
Day and Nighttime Views

Scenic Routes in Project Vicinity

There are no designated state scenic highways in the project vicinity. The nearest state highway eligible for designation is the segment of Highway 37 that borders San Pablo Bay to the north, between Highway 101 on the west and Highway 29 near Vallejo on the east (Caltrans, 2006). While the Quarry site may be visible from this stretch of highway, it is about nine miles away at the nearest point, so would not factor prominently in views from this segment of the highway.

The segment of North San Pedro Road (the northern extension of Point San Pedro Road) that runs through China Camp State Park is designated a scenic rural roadway in the Community Design Element of the San Rafael General Plan. Due to intervening topography and vegetation there are no views from this segment of roadway to the project site.

Applicable Plans

The Marin Countywide Plan Update (2007)

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to aesthetics and visual quality are discussed in Section 4.6, Land Use and Planning.

Impacts and Mitigation Measures

Significance Criteria

The visual character of a landscape depends on such attributes as color, texture, complexity, and the form of landscape components. Impacts on visual resources are evaluated and determined by comparing changes in these attributes that would result from the project. The reduction of a view's complexity, or the obstruction of or encroachment upon background or middle ground views all would contribute to the significance of impacts. Consistent with Appendix N of the County's Environmental Impact Review Guidelines (EIR Guidelines) and California Environmental Quality Act Guidelines (CEQA *Guidelines*) Appendix G (Environmental Checklist) the project could have a significant impact on visual resources if it would:

- conflict with the County goals and policies related to visual quality, or other applicable aesthetic or visual policies or standards;
- significantly alter the existing natural viewsheds, including changes in natural terrain or vegetation;
- significantly change the existing visual quality of the region or eliminate significant visual resources;
- significantly increase light and glare in the project vicinity; or
- significantly reduce sunlight or introduce shadows in areas used extensively by the public.

Impacts of the Amended Reclamation Plan

Impact R4.1-1: Visual impacts on the view from Vantage Point 3, the public walkway and public road southwest of the site (Significant).

Figure 4.1-10 presents simulations of the site as seen from the public walkway and Point San Pedro Road along San Rafael Bay at the end of Phase II and at the end of Phase IV of the proposed ARP. At the end of Phase II, the surcharge berm will have been completed and is shown in the foreground, in front of the buildings of the McNear's Brickyard (as shown in the top simulation of Figure 4.1-10). Although the surcharge berm obscures some of the low structures at the McNear's operation, the kilns and smokestacks that provide a distinctive visual character to the site are readily visible and the overall view of the site is not substantially affected. Although quarrying South Hill will have continued, because the grove of trees on the north slope will be retained and the vegetation on the north slope undisturbed, the impacts on visual quality of the proposed ARP (in conjunction with ongoing, currently permitted Quarry operations) as seen from this viewpoint would be less than significant.

By the end of Phase IV, the surcharge berm would be removed as would most or all of the buildings at McNear's Brickyard. The simulation shows all of the buildings removed, since the ARP does not definitively state which, if any, buildings will be retained for site redevelopment. Grading of berms, stockpiles, and lowering and grading of the small hill on the west side of South Hill (right side of figure) would result in removal and modification of vegetation on the north and west slopes of South Hill. The change in vegetation and profile of the view as seen from this vantage point would be relatively minor and have a less-than-significant effect on overall visual quality in this area. The removal of all the McNear's Brickyard structures (especially in conjunction with the alteration of the hill's profile and the grading and revegetation for future development west on northwestern flank of South Hill) would constitute the loss of a significant visual resource for this area, a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.1-1a: Implementation of Mitigation Measure R4.12-6a, retention of Hoffman Kiln #1 and its stack, would partly mitigate this impact.

Mitigation Measures Identified in this Report

Mitigation Measure R4.1-1b: Implementation of Mitigation Measures Mitigation Measure R4.12-5a, R4.12-6b, and R4.12-6c in conjunction with Mitigation Measure R4.12-7a, to ensure that key historic structures are preserved, would also mitigate the adverse visual impacts that would result from the loss of these structures.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.1-1: The Marin County DPW and CDA Building and Safety will verify SRRQ's compliance with Mitigation Measures R4.1-1a and R4.1-1b. See also Draft Mitigation Monitoring Measure R4.12-6 in Section 4.12, Cultural Resources.



Simulated View from Vantage Point 3 at the end of Phase II



Simulated View from Vantage Point 3 at the end of Phase IV

SOURCE: Field of Vision; San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-10
Simulated Views from Vantage Point 3 –
Phase II and Phase IV

Level of Significance after Mitigation

Less than significant.

Impact R4.1-2: Visual impacts on the view from Vantage Point 5, Via Montebello near San Marino Drive in the Peacock Gap Neighborhood (Significant).

Figure 4.1-11 presents simulations of the site as seen from Via Montebello, off San Marino Drive west of the site, at the end of Phase II and at the end of Phase IV of the proposed ARP. As shown in the top image of Figure 4.1-11, the most substantial visual change in the view from this vantage point by the end of Phase II is the removal of a part of South Hill (near the central site roadway). However, the effect on the view is to allow a little more of the Bay and hills beyond it to be seen, without significantly affecting the profile and visual essence of the hill within the landscape. Moreover, this change in South Hill results from continued permitted Quarry operations toward achievement of final reclamation grades already approved under the adopted 1982 Amended Reclamation Plan (ARP82), not the proposed reclamation activities proposed under the proposed 2004 Amended Reclamation Plan (ARP04). The recharge berm in the vicinity of McNear's Brickyard, which is part of the proposed ARP, can be seen from this vantage point but is not itself a prominent visual feature, nor does it obscure important visual features such as prominent historic structures and smokestacks.

As shown in the lower image of Figure 4.1-11, by the end of Phase IV, all the existing and interim berms will be removed, industrial areas of in the NE and NW quadrants will be graded to allow for future redevelopment and revegetated. The removal of berms and stockpiles and final grading allows the Main Quarry Bowl to be seen (shown here flooded for its planned future use as a marina). A few key, visually prominent structures of the McNear's Brickyard retained at the site would contribute visual interest and character to the site as seen from this vantage point, but the simulation shows all of the buildings removed, since the ARP does not definitively state which, if any, buildings will be retained for site redevelopment. South Hill itself is smaller, due to continued quarrying (as currently permitted), creating a wider view of the Bay and mountains beyond. The removal of most or all of the McNear's Brickyard structures (especially in conjunction with the alteration of the hill's profile and the grading and revegetation on the northwestern flank of South Hill) would constitute the loss of a significant visual resource for this area. This would be a significant impact.

Mitigation Measures Proposed as Part of the Project

See Mitigation Measure R4.1-1a.

Mitigation Measures Identified in this Report

See Mitigation Measure R4.1-1b.



Simulated View from Vantage Point 5 at the end of Phase II



Simulated View from Vantage Point 5 at the end of Phase IV

4.1-18

Mitigation Monitoring and Reporting

See Draft Mitigation Monitoring Measure R4.1-1.

Level of Significance after Mitigation

Less than significant.

Impact R4.1-3: Visual impacts on the view from Vantage Point 6, a Marin Bay Park Court residence north of the site (Less than Significant).

Figure 4.1-12 presents simulations of the site as seen from the deck of a residence on Marin Bay Park Court, across Cantera Way from the site's northern boundary, at the end of Phase II and at the end of Phase IV of the proposed ARP. By the end of Phase I (and as shown in this simulation of the end of Phase II), a berm will have been constructed in the NE Quadrant as a visual and noise buffer between residences and reclamation activities proposed in this quadrant. The berm, plainly visible behind the trees on the left side of the view, obscures a small segment of distant mountains that were previously visible beyond the trees here (as shown in the existing view in Figure 4.1-6). The more westerly view from this vantage point (on the right side of the figure) toward the quarried slope of South Hill, San Francisco Bay, and the Richmond-San Rafael Bridge, is unaffected by the berm. As seen from this view, more of South Hill has been quarried (compared with the existing setting) and as a result a slightly larger segment of the bridge and Bay are visible.

By the end of Phase IV, the NE quadrant berm would be removed, more of South Hill would be removed, and the site would be graded for future development. As a result of quarrying, a slightly larger segment of the Bay and the Richmond-San Rafael Bridge is visible in the right side of the view. Because the berm would be removed, the mountains beyond would once again be visible in the left side of the view.

The principal impact on the view from this vantage point is from construction of the berm in the NE Quadrant. The berm would be in place during much of the approximately 17 years of continuing mining and reclamation activities expected under the proposed ARP, a substantial amount of time. However, the portion of the view affected by the berm is already largely obscured by the many trees located between the residence and the Quarry boundary. These trees also would be expected to grow to some extent in the coming years, likely further obscuring the limited distant views. In addition, the views toward the west (right side of figure) from this vantage point would remain largely unaffected except that a segment of Bay and bridge will be slightly more visible in the future; this does not represent a change from the approved ARP82.

The visual impacts of the proposed ARP from this viewpoint would not significantly alter existing natural viewsheds because the construction of the berm in the NE quadrant affects only part of an existing view that is already quite limited by existing trees; the other part of the view from this vantage point remains open to the Bay and bridge and hills beyond., Because the



Simulated View from Vantage Point 6 at the end of Phase II



Simulated View from Vantage Point 6 at the end of Phase IV

SOURCE: Field of Vision; San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-12
Simulated Views from Vantage Point 6 –
Phase II and Phase IV

primary visual change (resulting from berm construction) would not be permanent and would not conflict with the County policy on viewshed protection nor significantly change the existing visual quality of the region, impact on visual quality and aesthetics from this viewpoint would be less than significant.

Mitigation: None required.

Impact R4.1-4: Visual impacts on the view from Vantage Point 8, China Camp State Park (Less than Significant).

Figure 4.1-13 presents simulations of the site as seen from China Camp State Park north of the site, at the end of Phase II and at the end of Phase IV of the proposed ARP. As seen from this view point, at the end of Phase II the profile of South Hill is somewhat reduced and at the end of Phase IV, South Hill is further reduced. Furthermore, by the end of Phase IV, previously existing screening vegetation as well as an additional part of the hill would have been quarried, so that a portion of the vertical face of the Quarry and terraced development plains can be seen from this viewpoint. These changes would result from achievement of final reclamation grades that are permitted under ARP82, not from the proposed ARP04. In addition, as shown in the two simulations of future views from this area of China Camp State Park, the effects of changes at the Quarry site on views would be minor and less than significant.

Mitigation: None required.

Impact R4.1-5: Visual impacts on the view from Vantage Point 11, the public ferry, San Pablo Bay (Beneficial).

Figure 4.1-14 presents simulations of the site as seen from the Vallejo ferry at a point east of the site, at the end of Phase II and at the end of Phase IV of the proposed ARP.

The effects from ongoing quarrying and subsequent reclamation grading are most dramatic as seen from this viewpoint. However, compared to the already highly altered, industrialized appearance of the site as currently seen from this view, the overall impacts on the visual environment of the proposed changes would be minor.

By the end of Phase II, changes at the site are clearly apparent at South Hill and in the vicinity of the Main Quarry Bowl. These changes primarily result from quarrying toward achievement of already-permitted final reclamation grades specified in ARP82.

By the end of Phase IV, the site would be more dramatically altered, particularly the area of South Hill, where the “clean blasted” Quarry slopes are proposed to serve as the backdrop for future development terraces under both the currently permitted and proposed ARP. Elsewhere on



Simulated View from Vantage Point 8 at the end of Phase II



Simulated View from Vantage Point 8 at the end of Phase IV

SOURCE: Field of Vision; San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-13
Simulated Views from Vantage Point 8 –
Phase II and Phase IV

the site, as seen from this vantage point, stockpiles and industrial equipment would be removed, and the area graded and planted. Grading and revegetating the area that now consists of stockpiled material and exposed quarried slopes would be a beneficial contribution to the visual quality of the site and serve to balance the increasingly noticeable effects of quarrying activities.

Mitigation: None required.

Impact R4.1-6: Visual impacts from McNear's Beach County Park (Less than Significant).

As shown in Figure 4.1-6, the Quarry's operations area and barge loading dock are visible from the pier at McNear's Beach County Park; this area of the Quarry is also visible to a lesser degree from other areas of the park. Reclamation grading will not occur in this area until the cessation of mining operations; thereafter, equipment will be removed, and the area graded. Since the industrial character of the view is not considered an aesthetic asset, the eventual removal of mining equipment and operations would not be expected to have an adverse effect on visual resources. Evaluation of the effects of post-reclamation development on views from this location, including the possible construction of a ferry terminal, should be evaluated as part of review of the final Development Plan, which is to be submitted three years prior to the cessation of mining activity.

Mitigation: None required.

Impact R4.1-7: Adverse impacts due to light and glare (Less than Significant).

Daytime light and glare: No new structures or similar permanent potential sources of light and glare are proposed. The proposed construction of the surcharge berm in the NW Quadrant and the temporary berm in the NE Quadrant, and related grading, cut, and fill activities proposed for each phase of the proposed reclamation plan will involve construction vehicles whose windshields and windows could be a source of glare. However, the activities of these vehicles will be of limited duration and would be located at a considerable distance from the residential receptors that could conceivably be affected by glare. The visual impacts of subsequent activities in the NE Quadrant would be mitigated by the berm that is proposed to be constructed during Phase I.

Because potential new sources of glare at the site during the proposed ARP would be minor, and would be located at a distance from possible receptors, the impacts of new daytime light and glare would be less than significant.

Nighttime light and glare: No changes are proposed to the permitted final grades at South Hill that would allow more nighttime lighting to be seen from the north and west. Reclamation activities would also be restricted to regular hours of operation. In addition, no changes are proposed to the current lighting plan used at the site. As shown in the existing night views of the site (Figures 4.1-5 and 4.1-9) nighttime operations are essentially shielded views from the north and west by intervening topography and vegetation. While nighttime lighting is brighter as seen



Simulated View from Vantage Point 11 at the end of Phase II



Simulated View from Vantage Point 11 at the end of Phase IV

SOURCE: Field of Vision; San Rafael Rock Quarry

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Figure 4.1-14
Simulated Views from Vantage Point 11 –
Phase II and Phase IV

from the east, this is currently permitted (and largely associated with operations, rather than reclamation; see Impact P4.1-8. Grading and revegetation activities associated with the proposed ARP would likely be undertaken primarily, if not entirely, during daylight hours. Since no changes are proposed to the current lighting plan at the site, the proposed ARP would not result in significant adverse impacts from nighttime light or glare. The effects of post-reclamation land uses related to nighttime light and glare would need to be evaluated when the development plan is submitted prior to cessation of Quarry operations.

Mitigation: None required.

Impact R4.1-8: Visual impacts at completion of the proposed Amended Reclamation Plan (Less than Significant).

Although post-reclamation development is not part of the proposed project, a key purpose of the ARP is to ensure that the site can be reclaimed for subsequent beneficial use following the cessation of Quarry operations. The simulations of the site at the end of Phase IV shown in Figures 4.1-10 through 4.1-14 indicate that the site will be graded and contoured consistent with the residential, commercial, and marina uses following reclamation. As discussed above, the impacts of the proposed final grades on visual quality of the site and surroundings are similar to the currently-approved ARP82 and would be less than significant. Therefore, the impacts of the proposed ARP04 through the final phase of reclamation on the visual quality of the site and surroundings as a whole would be less than significant.

Note: The project sponsor has not provided drawings or plans with a specific proposal for post-reclamation development of the site, except for the conceptual placement of certain land uses shown in Figure 3-6 of the Project Description. As described in the Project Description, a Development Plan shall be submitted three years prior to the cessation of Quarry operations. This plan will include specific proposals for development of the site, and will be required to undergo environmental review as well as applicable permitting procedures. In conjunction with the proposed ARP82, SRRQ prepared a model of potential future land uses. A photo of this model is presented in Figure 4.1-15 for informational purposes only, to provide a general idea of the post-reclamation land use for the site that was considered at the time the current ARP was approved. As discussed, the post-reclamation land use is not a subject of this EIR.

Mitigation: None required.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.1-9: Proposed nighttime operations would introduce new sources of light and glare (Significant).

Under the existing Surface Mining and Quarrying Permit and Amended Reclamation Plan, there are no permit restrictions on Quarry hours of operations, nor a record of hours of operations in



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.1-15
1982 Conceptual Model of
Post-Reclamation Land Use

1982. ARP82 states, however, that noise generating operations (presumably including barge loading, quarrying activities, and operation of the crushing plant) are generally limited to daylight hours on weekdays, except in case of emergencies. Proposed hours of operation for barge loading, quarrying activities other than blasting, and operation of the crushing plant include nighttime and weekends (see Table 3-9 in the Project Description). These activities would be visible from public vantage points, including the Bay and some vantage points across the Bay, from public roadways, from McNear's Beach County Park, and from nearby residences. Visible activities that would cause nighttime light and glare would include mining operations on South Hill, operation of the crushing plant, and barge loading operations. Some of these activities, including operation of trucks and mobile equipment, would produce light sources that could not be shielded effectively. Therefore, the proposal would have a significant negative aesthetic effect on existing nighttime visual resources.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.1-9: The AQP will restrict operations that have the potential to cause nighttime sources of light and glare and that are visible from public vantage points (including the Bay and vantage points across the Bay), roadways, and residences to daytime hours, except during emergency operations. See Mitigation Measure 4.6-6b in Section 4.6, Land Use and Planning.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.1-9: The Marin County DPW will verify SRRQ's compliance with Mitigation Measure P4.1-9. See also Mitigation Monitoring Measure 4.6-6 in Section 4.6, Land Use and Planning.

Level of Significance with Mitigation

This Mitigation Measure would reduce Impact P4.1-9 to a less-than-significant level.

Impact P4.1-10: Visual impacts from McNear's Beach County Park (Less than Significant).

As shown in Figure 4.1-6, the Quarry's operations area and barge loading dock are visible from the pier at McNear's Beach County Park; this area of the Quarry is also visible to a lesser degree from other areas of the park. Ongoing operations of the Quarry under the AQP are not expected to change these views from their current industrial character. While the proposed AQP could result in increased production and increased use of barges for shipping material which could be considered by some to be an adverse aesthetic impact; however, Mitigation Measure 4.6-6b in Section 4.6, Land Use and Planning, would limit production to 1982 levels; no increase in barge traffic is therefore expected.

Because the AQP would not degrade the character of views from McNear's Beach County Park, this impact is considered less than significant.

Mitigation: None required.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

Impact C4.1-11: Impacts on visual resources of ongoing quarrying operations, in conjunction with impacts of phased reclamation grading activities, could cause a cumulative impact (Less than Significant).

Under the ARP, reclamation grading would occur in phases, simultaneous with ongoing mining operations. As described above, visual impacts of reclamation grading could cause significant impacts, but with mitigation, these would be reduced to less than significant; other impacts are less than significant without mitigation. Similarly, Impact P4.1-9 indicates that mining activities under the AQP could cause a significant impact, which would also be mitigated with the specified measures. With incorporation of the mitigation measures, the cumulative impact on visual resources of the two projects combined would be considered less than significant.

Mitigation: None required.

References – Aesthetics

California Department of Transportation (Caltrans), California Scenic Highway System: A list of eligible and officially designated routes, www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm, accessed September 25, 2006.

Marin County, Resolution No. 81-253, Resolution of the Board of Supervisors of the County of Marin to Adopt the Peacock Gap Neighborhood Plan, August 18, 1981.

Marin County, *The Marin Countywide Plan Update*, adopted November 2007.

Marin County, *Environmental Impact Review Guidelines (EIR Guidelines)*, Appendix N. Criteria for Significance and list of Ministerial Projects, adopted May 17, 1994.

City of San Rafael, *San Rafael General Plan 2020*, adopted 2004.

4.2 Air Quality

This chapter analyzes the potential for the Amended Reclamation Plan (ARP) and Amended Surface Mining and Quarrying Permit (AQP) to impact air quality adversely through increased emission of air pollutants.

Setting

Climate and Meteorology

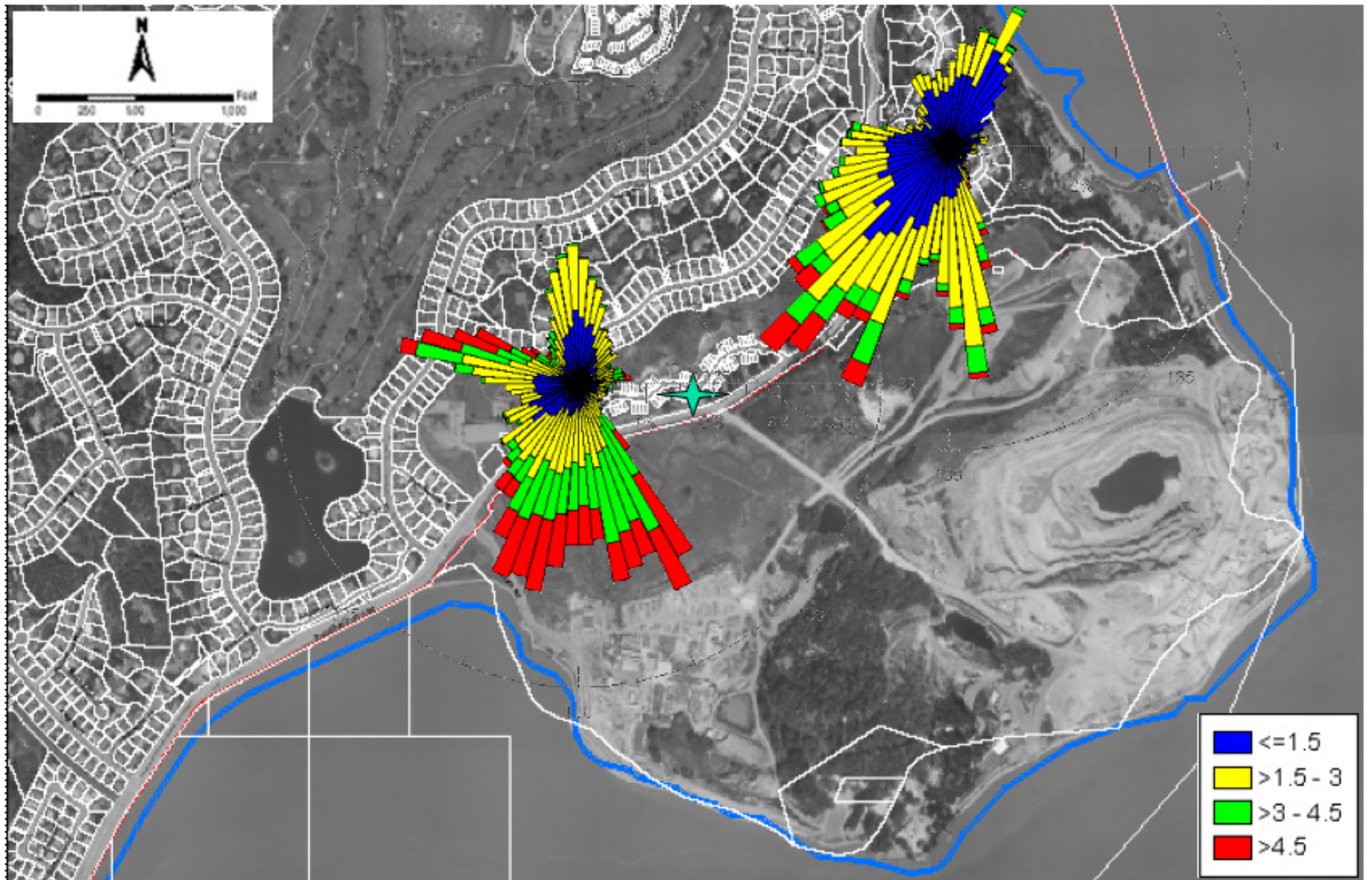
The primary factors that determine air quality are the locations of air pollutant sources and the amounts of pollutants emitted. Meteorological and topographical conditions are also important factors. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

The San Francisco Bay Area climate is Mediterranean in character, with mild, rainy winter weather from November through March, and warm, dry weather from June through September. Movements of marine air, which in large part determine the temperature, humidity, wind, and precipitation throughout the year, depend upon the location and strength of the dominant Pacific high-pressure system and the coastal temperature gradient. Within the Bay Area, average air temperature increases as distance from the coast and Bay increases.

In the summer, the Pacific high-pressure system typically remains near the coast of California. Subsidence of warm air associated with the Pacific high-pressure system creates frequent summer temperature inversions. Subsidence inversions may be several hundred to several thousand feet deep, effectively trapping pollutants in a small volume of air near the ground. In the winter, the Pacific high-pressure system moves southward, allowing ocean-formed storms to move through the region. Frequent storms and infrequent periods of sustained sunny weather are not conducive to smog formation. Stagnant atmospheric conditions can exist for several days between storms. Radiational cooling during the winter evenings, however, sometimes creates thin inversion layers and concentrates air pollutant emissions near the ground.

The meteorological station nearest the project site is located at Point San Pablo, approximately two miles southeast, across San Pablo Bay. Here, the annual average wind speed is 7.3 miles per hour, with the predominant wind direction out of the south southwest (California Air Resources Board, 1992). This meteorological station is representative of the project site not only because it is closest, but also because, like the project site on Point San Pedro, it is located on a point that is directly exposed to the open fetch of Bay winds. Together the two points form the southern entrance to San Pablo Bay. Additionally, a meteorological station was temporarily established across from the project site as a part of an air quality monitoring effort conducted in 2004 and 2005. Figure 4.2-1 shows wind rose data (velocity and direction) from these adjacent

4.2-2



Colors correspond to wind speed in meters per second.
Azimuth delineates wind direction and percentage of time.

SOURCE: STI

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Figure 4.2-1
Wind Rose Data for
Via Montebello Site and Marin Bay Park Site
April 2004 to June 2005

meteorological stations located at Via Montebello and Marin Bay Park Drive, directly across Point San Pedro Road from the project site (STI, 2005). This meteorological data was verified by the Bay Area Air Quality Management District (BAAQMD).

The eastern areas of Marin County (County), such as at San Rafael, have warmer weather than the western side due to the distance from the ocean and the hills that separate the eastern County areas from the coast. Temperatures in eastern County areas are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. The average maximum summer temperatures in the project site vicinity are in the low-80s and the average minimum winter temperatures are in the low-40s (BAAQMD, 1999).

Air pollution potential is highest in the eastern areas of Marin County, where most of the population is located in semi-sheltered valleys. While the County does not have many polluting industries, the air quality on its eastern side, particularly along the U.S. 101 corridor, may be affected by emissions from increasing motor vehicle use within and throughout the County (BAAQMD, 1999).

Laws, Regulations, and Plans

Federal

The 1977 federal Clean Air Act (CAA) required the United States Environmental Protection Agency (USEPA) to identify National Ambient Air Quality Standards (national standards) to protect public health and welfare. National standards have been established for the six “criteria air pollutants,” so-called because the USEPA publishes criteria documents to justify the choice of standards. The six “criteria air pollutants” for which federal and state ambient standards have been established are: ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), suspended particulate matter (PM-10), and lead (Pb). Documented health effects from air pollution include acute respiratory infections, chronic bronchitis, pulmonary emphysema, and bronchial asthma. Criteria pollutant standards are listed in Table 4.2-1.

Pursuant to the 1990 federal Clean Air Act Amendments, the USEPA classified air basins (or portions thereof) as either “attainment” or “nonattainment” for each criteria air pollutant, based on whether the national standards had been achieved. The project site lies within the San Francisco Bay Area Air Basin (Air Basin), which the USEPA has designated as nonattainment with respect to the federal 8-hour ozone standard. The Air Basin is classified as an attainment area for carbon monoxide, sulfur dioxide and lead and is unclassified for respirable particulate matter and nitrogen dioxide (CARB, 2006a). “Unclassified” is defined by the Clean Air Act Amendments as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Regulation of toxic emissions, termed Toxic Air Contaminants (TACs) under California State law and Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal and state controls on individual sources. The 1977 Clean Air Act Amendments required the USEPA

**TABLE 4.2-1
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS**

Pollutant	Averaging Time	(State) SAAQS ^a		(Federal) NAAQS ^b	
		Standard	Attainment Status	Standard	Attainment Status
Ozone	1 hour	0.09 ppm	N	NA	NA
	8 hour	NA 0.07 ppm	NA N	0.08 0.075 ppm	N
Carbon Monoxide	1 hour	20 ppm	A	35 ppm	A
	8 hour	9.0 ppm	A	9 ppm	A
Nitrogen Dioxide	1 hour	0.18 ppm	A	NA	NA
	Annual	NA 0.030 ppm	NA	0.053 ppm	A
Sulfur Dioxide	1 hour	0.25 ppm	A	NA	NA
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Particulate Matter (PM10)	24 hour	50 µg/m ³	N	150 µg/m ³	U
	Annual ^c	20 µg/m ³	N	NA 15 µg/m ³	A
Fine Particulate Matter (PM2.5)	24 hour	NA	NA	35 µg/m ³	U
	Annual	12 µg/m ³ ^d	N	15 µg/m ³	A
Sulfates	24 hour	25 µg/m ³	A	NA	NA
Lead	30 day	1.5 µg/m ³	A	NA	NA
	Quarter	NA	NA	1.5 µg/m ³	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	see note d	A	NA	NA

NOTES: A = Attainment; N = Nonattainment; U = Unclassified; NA = Not Applicable; ppm = parts per million; µg/m³ = micrograms per cubic meter.

^a SAAQS = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 hour and 24 hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

^b NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the three-year average of the 4th highest daily concentration is 0.08 ppm or less. The 24-hour PM10 standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour PM2.5 standard is attained when the three-year average of the 98th percentile is less than the standard.

^c State standard = annual geometric mean; national standard = annual arithmetic mean.

^d Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCE: BAAQMD, 2006-2008.

to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

The 1990 Clean Air Act Amendments offer a technology-based and performance-based approach to reducing air toxics from major sources of air pollution, followed by a risk-based approach to address any remaining, or residual risks. Under the 1990 Clean Air Act Amendments, designated HAPs are regulated under a two-phase strategy. Under the technology based-approach, the USEPA develops standards for controlling the routine emissions of air toxics from each major

type of facility within an industry group (or source category). These standards require facilities to install controls, known as Maximum Achievable Control Technology (MACT), based on emissions levels that are already being achieved by better-controlled and lower-emitting sources in an industry. MACT includes measures, methods and techniques, such as material substitutions, work practices, and operational improvements, aimed at reducing toxic air emissions. The USEPA has issued MACT standards covering over 100 source categories of major industrial sources, such as chemical plants, oil refineries, and steel mills, as well as categories of smaller sources, such as dry cleaners, commercial sterilizers, and chromium electroplating facilities.

Under the federal 1990 Clean Air Act Amendments (40 Code of Federal Regulations [CFR], Part 70), major sources of criteria pollutants or HAPs are required to obtain a federally-enforceable Title V operating permit. Title V programs are developed at the state or local level, as outlined in 40 CFR, Part 70. The existing operations of the Quarry do not require a Title V permit, as emissions of HAPs are below threshold quantities.

State

The California Air Resources Board (CARB) manages air quality, regulates mobile emissions sources, and oversees the activities of County Air Pollution Control Districts and regional Air Quality Management Districts. CARB regulates local air quality indirectly by establishing state ambient air quality standards and vehicle emissions standards, and by conducting research, planning, and coordinating activities.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These standards are shown in Table 4.2-1. Under the California Clean Air Act (CCAA), patterned after the federal CAA, areas have been designated as attainment or nonattainment with respect to the state standards. The San Francisco Bay Area Air Basin is a nonattainment area for ozone and respirable particulate matter with respect to state standards (CARB, 2006a). The Air Basin is designated as an attainment area for carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead.

California State law defines TACs as air pollutants having carcinogenic or non-carcinogenic health effects. The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) HAPs adopted in accordance with AB 2728, including benzene and diesel particulate matter (DPM). The Air Toxics “Hot Spots” Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. “High-priority” facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk levels, emitting facilities are required to implement varying levels of risk reduction measures. The Bay Area Air Quality Management District (BAAQMD) implements AB 2588, and is responsible for prioritizing facilities that emit air toxics, reviewing health risk assessments, and implementing risk reduction procedure.

Greenhouse Gases and Global Warming

Some gases in the atmosphere affect the Earth's heat balance by absorbing infrared radiation. These gases can prevent the escape of heat in much the same way as glass in a greenhouse. This is often referred to as the "greenhouse effect," and it is responsible for maintaining a habitable climate. Enhancement of the greenhouse effect can occur when concentrations of these gases exceed the natural concentrations in the atmosphere. The gases believed to be most responsible for global warming are water vapor, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Of these gases, carbon dioxide (CO₂) and methane are emitted in the greatest quantities from human activities. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. There is international scientific consensus that human-caused increases in greenhouse gases (GHGs) has and will continue to contribute to global warming, although there is still uncertainty concerning the magnitude and rate of the warming (IPCC, 2007).

Some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CARB, 2006c).

California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, requires CARB to establish a statewide GHG emission cap for 2020 based on 1990 emission levels, and to adopt mandatory reporting rules for significant sources of GHGs. Under AB 32, the ARB must adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 emission cap by 2020.

Local

BAAQMD is the agency empowered to regulate air pollutant emissions in the San Francisco Bay Area Air Basin. BAAQMD is responsible for implementing emissions standards and other requirements of federal and state laws. BAAQMD operates a regional network of monitoring stations that provides information on meteorology and ambient concentrations of air pollutants. The BAAQMD has the largest monitoring station network in the nation for monitoring TACs. Emissions of criteria air pollutants are regulated through both emissions limitations and the state standards.

Generally, emissions from stationary and area sources are regulated by the BAAQMD under the purview of the permit process. The BAAQMD conducts an engineering estimate of potential air emissions, and based on the findings may require the implementation of Best Available Control Technology (BACT) to control air pollution. Unlike the federal MACT, which is directed at TAC emissions, BACT is primarily intended to reduce criteria air pollutants and their precursors. BACT is already specified for most emission sources. In addition to specifying air pollution control equipment, the BAAQMD may impose restrictions on throughput volumes and total emission quantities. In order to have no net increase in air emissions, the BAAQMD may also require project sponsors that apply for a permit to construct new or modified facilities to offset emissions, at times at ratios higher than 1:1. Such offsets can come from emissions reductions elsewhere in the facility or from "emissions credits" that can be purchased from the BAAQMD's "Emissions Bank," set up for emissions trading purposes. Emissions of TACs are evaluated by

the BAAQMD on a case-by-case basis in accordance with Regulation 2, Rule 5 New Source Review of Toxic Air Contaminants. Sources with risk above de minimus levels must use TBACT (BACT for Toxics); projects that exceed risk standards are denied.

The BAAQMD is responsible for regulating those portions of the Quarry that have air emissions and the potential to affect air quality. Operations at the Quarry are regulated by the BAAQMD under two Permits to Operate (PTOs). The current primary PTO for San Rafael Rock Quarry (referred to in the permit as Plant #11036) was updated by the BAAQMD on November 18, 2004, and is reissued annually. This permit covers emissions from on-site stationary source quarrying operations such as crushing, screening equipment maintenance and storage piles. The BAAQMD has also issued a PTO to the Quarry for operation of a gasoline dispensing facility at the Quarry, which is also reviewed annually.

Air Quality Plans

Ozone Attainment Plans are prepared by local air districts to comply with the national ozone standard and Clean Air Plans are prepared to comply with the state ozone standard. As such, the BAAQMD has adopted its *Bay Area 2005 Ozone Strategy*, which is the latest update of the District's original *Bay Area 1991 Clean Air Plan*. The goal of the plan is to improve air quality by reducing emissions of certain pollutants (reactive organic gases [ROG] and nitrogen oxides [NO_x]) that lead to the formation of ozone, through tighter industry controls, cleaner cars and trucks, cleaner fuels, and increased commute alternatives. The plan encourages cities and counties to adopt measures in support of this goal (BAAQMD, 2005a).

Countywide Plan Air Quality Resources Policies

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to air quality are discussed in Section 4.6, Land Use and Planning.

Marin County Greenhouse Gas Reduction Plan

In October of 2006 the Marin County Board of Supervisors adopted the Marin County Greenhouse Gas Reduction Plan. The Plan sets a target to reduce GHG emissions 15-20 percent below year 1990 levels by the year 2020 for internal government emissions and a reduction of 15 percent below 1990 levels Countywide. The Plan identifies resources and programs to reduce GHG emissions in concert with internal measures already in place through the Department of Public Works and adopted in the Countywide Plan Update (which was adopted in November, 2007; see Section 4.6, Land Use and Planning). These reduction measures in the Plan address emissions from building energy use, transportation, waste management and land use.

Existing Air Quality in the Project Vicinity

Criteria Air Pollutants

The air quality of the Air Basin is determined by routinely monitoring changes in the quantities of criteria pollutants in the ambient environment. Air quality in the area is a function of the criteria

pollutants emitted locally, the existing regional ambient air quality, and the meteorological and topographic factors which influence the intrusion of pollutants into the area from sources outside the immediate vicinity.

The BAAQMD's monitoring station located closest to the project site is on 4th Street in the City of San Rafael, roughly four miles southwest of the project site. Data collected at this station is considered to be generally representative of overall air quality at the project site. Table 4.2-2 summarizes the highest annual concentrations of ozone, carbon monoxide, and PM-10 for the most recent years available (2002-2006) and compares ambient air pollutant concentrations with the state standards, which are more stringent than the corresponding national standards. The health effects of each of these pollutants, and the sources and concentrations of these pollutants are discussed below. The nearest BAAQMD monitoring station that collects data for PM-2.5 is located in San Francisco, approximately 16 miles south of the project site. These data are also presented in Table 3.E-2 4.2-2.

**TABLE 4.2-2
SAN RAFAEL AIR POLLUTANT SUMMARY (2002-2006)**

Pollutant	Standard ^b	Monitoring Data by Year ^a				
		2002	2003	2004	2005	2006
Ozone						
Highest 1-hour average, ppm		0.077	0.087	0.091	0.081	0.089
Days over state standard	0.09	0	0	0	0	0
Highest 8-hour average, ppm	0.07	0.056	0.067	0.063	0.059	0.058
Days over national standard	0.08	0	0	0	0	0
PM₁₀						
Highest 24-hour average, state / national, µg/m ³		72.6/69.6	40.5/39.1	52.3/51.0	39.1/37.1	19.9
Measured days over state/national standard	50/150	3/0	0/0	1/0	0/0	0/0
PM_{2.5} (San Francisco Station):						
Highest 24-hour average, µg/m ³		70.2	41.6	45.8	43.6	31.5
Days over national standard	35 ^e	4	0	0	0	0
Annual arithmetic mean, µg/m ³		13.1	10.2	9.9	9.5	NA
Exceeds state/national standard?	12/15	No	No	No	No	No
Carbon Monoxide:						
Highest 8-hour average, ppm		1.9	2.0	2.0	1.7	1.4
Days over state/national standard	9.0/9	0	0	0	0	0

^a Ozone, PM₁₀, and carbon monoxide data are from the San Rafael monitoring station. PM_{2.5} data are from the San Francisco station.
^b Generally, state standards are not to be exceeded and federal standards are not to be exceeded more than once per year.
^c As noted earlier, the national 1-hour ozone standard was revoked by the USEPA on June 15, 2005.
^d Measurements are collected every six days. Measured days include the days that a measurement was greater than the level of the standard. The actual number of days exceeding the standard is likely to be greater than presented here had each day been monitored.
^e The federal 24-hour PM 2.5 standard was reduced from 65 to 35 micrograms per cubic meter on 12/17/06. The number of days over the PM-2.5 24-hour standard for 2002 through 2005 is relative to the previous standard.

NOTES: ppm = parts per million; µg/m³ = micrograms per cubic meter
 NA = data not available.
Bold values are in excess of applicable standards.

SOURCE: California Air Resources Board (CARB), *Air Quality Data Statistics – Top Four Summary*, <http://www.arb.ca.gov/adam/cgi-bin/db2www/adamtop4b.d2w/start>, accessed March 19, 2007.

Ozone

Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_x. Significant ozone production generally requires about three hours in a stable atmosphere with strong sunlight. Ozone is a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production. Motor vehicles are the major source of ozone precursors in the Bay Area. Ozone causes eye and respiratory irritation, reduces resistance to lung infection, and may aggravate pulmonary conditions in persons with lung disease. Ozone also damages vegetation and untreated rubber. As shown in Table 4.2-2, the state ozone standard was not violated in the past five years at the San Rafael monitoring station.

Carbon Monoxide (CO)

Carbon monoxide is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. Motor vehicles are the major contributors to CO generation. Ambient CO concentrations normally correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence CO concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area out to some distance from vehicular sources. High concentrations of CO in respired air can impair the ability of the human body to absorb oxygen into the bloodstream, thereby aggravating cardiovascular disease and causing fatigue, headaches, and dizziness. As shown in Table 4.2-2, measured CO levels at the San Rafael monitoring station have not violated the state eight-hour standard in the last five years.

Respirable Particulate Matter (PM-10 and PM-2.5)

PM-10 consists of particulates 10 microns (a micron is one one-millionth of a meter) or less in diameter and PM-2.5 consists of particulates 2.5 microns or less in diameter. Both PM-10 and PM-2.5 represent fractions of particulate matter which can be inhaled deeply into the lungs and cause adverse health effects. Particulates in the atmosphere result from many kinds of dust- and fumes-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local particulate matter concentrations, while others, such as vehicular traffic, affect regional particulate matter concentrations.

Natural sources of particulates include wind erosion from exposed surfaces. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates can also damage materials and reduce visibility.

While PM-10 data is collected at the San Rafael station, the nearest BAAQMD monitoring station that collects PM-2.5 data is located in San Francisco. Both PM-10 and PM-2.5 data are collected every six days with approximately 60 sampling days per year. Table 4.2-2 shows that the PM-10 standard was violated in two of the past five years, for a total of four days over approximately 300 sampling days. The national 24-hour standard for PM-2.5 was exceeded during one of the last five years for a total of four days over approximately 300 sampling days. Consequently,

violations of the applicable particulate standards can be considered to have occurred approximately one percent of the time in San Rafael and San Francisco. However, the federal 24-hour PM 2.5 standard was reduced from 65 to 35 micrograms per cubic meter on December 17, of 2006. Application of this new standard to historical data would result in violations having occurred in four of the past five years for a total of at least 16 days over approximately 300 sampling days, or approximately five percent of the time.

Other Criteria Air Pollutants

The standards for nitrogen dioxide, sulfur dioxide, and lead are being met within the region, and trends in historical data of ambient concentrations of these pollutants show no signs of violating state or federal standards in the future (CARB, 2006b).

Non-Criteria Air Pollutants

CARB and BAAQMD operate a monitoring network for TACs within major urban areas of the Bay Area; the monitored data are used to determine the average annual concentrations of toxic air contaminants, and to assess the effectiveness of controls. The toxic air contaminant network is a complimentary program to the criteria air pollutant network. The Bay Area monitoring network includes 17 stations that measure volatile organic compounds (VOCs) and metals. Samples are collected every 12 days over a 24-hour period. The closest monitoring station to the Quarry is in the City of San Rafael and is the same station that measures criteria air pollutant concentrations (BAAQMD, 2007). The station measures ambient air concentrations of 18 different TAC species as gaseous air pollutants. The most recent monitoring data available for the station (the year 2003) are shown in Table 4.2-3. While diesel particulate matter (DPM) was identified as a TAC by the CARB in 1998, BAAQMD monitors PM-10 and PM-2.5 concentrations only and does not currently differentiate the DPM component of particulate emissions.

VOCs are organic compounds that can vaporize easily at ambient temperatures. Some VOCs are highly reactive and play a critical role in the formation of ozone. These compounds are also referred to as reactive organic gases (ROG). Other VOCs have adverse, chronic, and acute health effects. In some cases, VOCs can be both highly reactive and potentially toxic. Sources of VOCs in the Bay Area include motor vehicles, waste burning, gasoline marketing, industrial processes, and dry cleaning operations. In this section, the terms ROG and VOC are both used, reflecting the near synonymy of the terms, and their appearance in various background documents and regulations.

Assembly Bill 2588 (AB 2588), the Air Toxics “Hot Spots” Information and Assessment Act, was enacted by the State in 1987. AB 2588 requires companies throughout California to provide information to the public about emissions of TACs, and the impact those emissions may have on public health. Pursuant to the requirements of AB 2588, the BAAQMD publishes an air toxics emissions inventory that details the TAC emissions of facilities throughout the District. The latest inventory was published in 2004.

**TABLE 4.2-3
SAN RAFAEL TOXIC AIR CONTAMINANT (TAC) MONITORING DATA (2003)**

Pollutant	Annual Concentration (ppb)
Vinyl chloride	0.15
Dichloromethane	0.26
Chloroform	0.02
Ethylene Dibromide	0.01
1,1,1 Trichloroethane	0.03
Carbon Tetrachloride	0.10
Trichloroethylene	0.03
Benzene	0.38
Ethylene Dichloride	0.05
Perchloroethylene	0.08
Toluene	0.84
Acetone	3.02
Benzene	0.38
1,3-Butadiene	0.11
Ethyl benzene	0.11
Xylene (M and P)	0.47
Xylene (O)	0.15
Methyl ethyl ketone	0.26
Methyl tertiary butyl ether	0.37

SOURCE: Bay Area Air Quality Management District, 2007

There are 15 industrial facilities that emit TACs in the City of San Rafael (BAAQMD, 2007). Eleven of these sources are dry-cleaning facilities located three miles or greater from the project site. The Mount Tamalpais Mortuary, Central Marin Sanitation District Treatment Plant, and Las Gallinas Sanitary District Treatment Plant are also located over three miles from the project site. The remaining sources are the stationary TAC emission sources closest to the project site and their estimated emissions are:

- Dutra Materials (1000 Point San Pedro Road) – project site, emissions detail later in this section;
- Loch Lomond Cleaners (267 Loch Lomond Drive) – approximately 1.5 miles to the southwest of the project site; 243 pounds per year of perchloroethylene; and
- McNear’s Brickyard (1 McNear Brickyard Road) – project site; 8,200 pounds per year of hydrogen fluoride.

Greenhouse Gas Emissions

Marin countywide GHG emissions totaled 3.11 million tons of GHG as equivalent carbon dioxide (eCO₂) in year 2000. Carbon dioxide equivalent units are a weight-based measurement unit that accounts for varying degrees of heat absorption of GHG's and standardizes them to carbon dioxide, the most prevalent GHG. Countywide GHG emissions in 1990 were 2.63 million tons of eCO₂; the increase from 1990 to 2000 was therefore about 18 percent. Sources of Marin countywide GHG emissions include transportation (50 percent), residential sources (24 percent), commercial sources (16 percent), agricultural sources (6 percent), solid waste decomposition (3 percent) and industrial sources (1 percent) (Marin County, 2006).

Site Specific Emissions and Monitoring Data at San Rafael Rock Quarry

Criteria Air Pollutants

San Rafael Rock Quarry Permitted Emissions

Criteria air pollutant emissions from at SRRQ result from on site stationary source operations related to crushing equipment, screening equipment, motor vehicle maintenance and storage piles. The maximum daily emissions of the Quarry's stationary sources, as permitted by BAAQMD are presented in Table 4.2-4. Actual daily emissions are typically well below these allowable maximum emission rates.

**TABLE 4.2-4
 SRRQ PERMITTED DAILY EMISSIONS BY SOURCE**

Source Description	Annual Average Air Pollutant Emissions (lbs/day) ^a			
	TOG	NOx	PM10	CO
Crushers	0	0	173.0	0
Asphalt Silos	0	0	19.2	0
Rock Bunkers	0	0	3.6	0
Diesel tanks	0.1	0	0	0
Diesel Truck Station	1.4	0	0	0
Primary Plant Screening	0	0	52.4	0
Primary Plant Conveying	0	0	39.4	0
Asphalt Dryer	0.1	6.8	0	1.7
Screens	0	0	4.5	0
Storage Piles	0	0	5.2	0
Total Existing Permitted Emissions	2.0	7.0	297	2.0

SOURCE: BAAQMD, 2005b.

SRRQ's existing BAAQMD and County permits include requirements to reduce dust emissions. These include the following:

Existing Particulate Control Measures (required by BAAQMD permit)

- Use of baghouses, scrubbers and pulse jets on applicable stationary sources;
- Throughput restrictions for crushers and screening equipment, conveyors and storage piles;
- Facility-wide particulate emission limitation of Ringlemann 0.5¹;
- Watering of storage piles and roads;
- Particulate emissions restriction of 0.01 grains per cubic foot for primary crushers and screening equipment to be confirmed with source testing; and
- Maintenance of throughput records for crushers and screening equipment.

Dust Control Measures Required by County Surface Mining and Quarrying Permit

11: The Permittee shall employ such measures to keep the dust nuisance to a minimum and at the request of the Department of Public Works will water the working area to reduce the amount of dust when it is excessive.

An independent assessment of air quality permits and emissions at SRRQ was conducted for the County in August of 2005 (STI, 2005). This assessment found that all applicable stationary sources on site were operating under BAAQMD permit. The study also concluded that BAAQMD inspectors had found the facility to be operating in compliance with its permits, with historical violations occurring in 1996 and 2004 as the result of non-permitted equipment installation and visual emissions in excess of standards, respectively. The assessment identified improvements to water spraying techniques as the appropriate method of further particulate matter emissions control.

In addition to permitted emissions, Quarry operations result in emissions from mobile sources (which are outside the permit authority of the BAAQMD) such as loaders and other excavation equipment and trucks used to collect and transport excavated and processed materials. Both mobile excavation equipment and trucks are diesel operated and result in emissions of ROG, NOx and PM-10 as well as DPM. Mechanical operations of blasting, excavating, and loading and unloading of materials also result in fugitive emissions of PM-10 and PM-2.5 which are also not regulated by BAAQMD. A quantification of existing permitted and non-permitted emissions from SRRQ operations is presented in Table 4.2-5.

McNear's Brickyard Operations

The McNear's Brickyard facility operates, via lease, on the NW Quadrant of the project site. The brickyard operates a kiln that generates criteria pollutants. Based on an existing production rate of 47,680 tons of brick fired per year, the kiln generates approximately seven pounds per day of ROG, 48 pounds per day of NOx, 114 pounds per day of PM10 and 157 pounds per day of CO. The project does not include any changes to existing and ongoing brickyard operations.

¹ A series of shaded illustrations used to measure the opacity of air pollution emissions, ranging from light grey through black; used to set and enforce emissions standards.

**TABLE 4.2-5
EXISTING EMISSIONS OF CRITERIA AIR POLLUTANTS FROM QUARRY OPERATIONS**

Emission Source	Emissions (pounds per day)			
	CO	ROG	NO _x	PM-10
Permitted Stationary Sources	2.0	1.6 ^a	7.0	297
Exhaust Emissions from On-Site Excavation and Transport Equipment	53	12	132	5.1
Fugitive Dust Emissions from On-site Excavation and Transport Equipment (uncontrolled/controlled) ^b	–	–	–	336/400 <u>346/104</u>
Blasting	–	–	–	4
Off-Site Truck Emissions (trucks hauling materials to and from the project site)	254	48.8	761	32.0
Barge (Tugboat) Emissions	101	9.6	897	22.3
Total Quarry Operational Emissions (non-reclamation)	410	72.0	1,797	460 <u>464.4</u>^b

^a This value is less than the value given for TOG in Table 4.2-4. Per CARB's 2005 Emissions Inventory, 79 percent of TOG is in the form of ROG for mining processes.

^b Controlled emissions of PM-10 assume on-site watering to reduce fugitive emissions by 70 percent.

SOURCE: ESA and KB Environmental

Site Specific Air Quality Monitoring

In 2004 Marin County sponsored an air quality monitoring study specific to ambient air quality in the vicinity of the Quarry. Monitoring stations were established at Via Montebello and Marin Bay Park in the residential areas adjacent to the northern boundary of the Quarry. Monitoring of wind speed and direction was conducted and concentrations of PM-10 were measured from April 2004 to June 2005. Concentrations of PM-2.5 were measured at the Via Montebello station from March to June of 2005. Subsequently, filters used to collect PM-10 were analyzed in a laboratory for the presence of toxic metals and silica. A third monitoring station was established along Point San Pedro Road to monitor PM-10 over a two month period. The data were then used to estimate the concentrations of DPM along Point San Pedro Road.

Table 4.2-6 presents the results of the PM-10 and PM-2.5 monitoring effort and compares them to state and federal standards. The monitoring study identified the following conclusions relative to concentrations of PM-10 and PM-2.5 adjacent to the Quarry site:

- The highest hourly PM-10 concentrations predominantly occur when winds are from the north (away from the Quarry), and occasionally occur when the wind are from the direction of the Quarry.
- Correlation of data with blasting events shows that blasting activity results in elevated PM-10 concentrations for at most one to two hours. A majority of blasting events occurring during the monitoring effort were not associated with an identifiable change in PM-10 concentration.

**TABLE 4.2-6
24-HOUR AND ANNUAL AVERAGE CONCENTRATIONS OF PM-10 AND PM-2.5 ADJACENT TO SRRQ**

Pollutant (Averaging Time)	Concentration (ug/m ³)			
	Via Montebello	Marin Bay Park	State Standard	Federal Standard
PM-10 (24-hour maximum)	68	60	50	150
PM-10 (Annual)	16	18	20	revoked 12/06
PM-2.5 (24-hour maximum)	10	N/A	25	35 (65 at time of monitoring)
PM-2.5 (Annual)	3	N/A	12	15

SOURCE: STI, 2005.

- The state 24-hour PM-10 standard was exceeded on eight days during the 14 month monitoring effort, representing approximately two percent of the sampling days. Meteorological data (i.e., prevailing wind direction) suggests that regional pollution and not the Quarry was likely the major contributor to these high concentrations for six of these eight days.
- Statistical analysis of all the data collected during the 14-month period indicates that 24-hour average PM-10 concentrations at the two Point San Pedro Road monitoring stations were similar to each other as well as to concentrations monitored at the BAAQMD monitoring station on 4th Street in San Rafael.
- 24-hour PM-2.5 concentrations were all below both state and federal standards. Estimated annual average PM-2.5 concentrations were also below state and federal standards.

Additionally, the following conclusions may be drawn from the data in Table 4.2-6 and 4.2-2:

- The San Rafael air quality monitoring station operated by the BAAQMD on 4th Street in the City of San Rafael, roughly four miles southwest of the project site, recorded a maximum 24-hour average PM-10 concentration of 52.3 micrograms per cubic meter during 2004 and 39.1 in 2005.
- The highest 24-hour PM-10 concentration monitored near the project site over the 14-month monitoring period (68 micrograms per cubic meter) was higher than the 24-hour maximum monitored at the BAAQMD San Rafael station in four of the last five years. This reading occurred on a day when the prevailing wind was not from the direction of the Quarry, and when there was no reading at the San Rafael station.
- Annual average PM-10 concentrations near the project site are below the state standard and below the federal standard, which has recently been revoked. The average annual PM-10 concentrations near the project site are also similar to those measured by BAAQMD at the San Rafael station, which were 17.9 and 16.5 micrograms per cubic meter for 2004 and 2005, respectively.
- Localized sources of PM-10 near the project site (predominantly the Quarry and local roadway traffic) are different from sources near the BAAQMD San Rafael monitoring station at 534 4th Street, which is located within an urban setting and adjacent to Hwy 101 where vehicle emissions predominate. Consequently, comparison of project area data to

health-based state and federal standards is more meaningful than comparison of data between the project area and the BAAQMD station.

Non-Criteria Air Pollutants

Operations of the Quarry also result in emissions of toxic air contaminants (TACs). Stationary sources of TAC emissions on site consist of the gasoline facility and the adjacent McNear's Brickyard drying kilns. The most recent Air Toxics Annual Report generated by BAAQMD indicates that TAC emissions from permitted sources at the Quarry consist of 17.1 pounds per year of benzene and 107 pounds per year of formaldehyde (BAAQMD, 2004).

Diesel Particulate Matter

In addition to stationary sources of TACs, operations of diesel trucks and excavation equipment at the Quarry result in emissions of DPM, which was identified as a TAC in 1998 because it is a known carcinogen. Concentrations of DPM were monitored over a two month period in 2004 as a part of the County-sponsored air quality study. A monitoring station was established approximately 18 meters from the center of Point San Pedro Road adjacent to residences along Heritage Drive. Concentrations of DPM were estimated by measuring carbon black particulates and polycyclic aromatic hydrocarbons indicator species.

Monitoring indicated spikes in DPM concentrations from 15 to 45 nanograms per cubic meter (ng/m^3) regularly occurred during work days at the Quarry, while weekend concentrations were less than $5 \text{ ng}/\text{m}^3$, indicating that trucks entering and leaving the Quarry were the likely source of DPM emissions in the area. Assessment of risks to nearby sensitive receptors associated with long-term exposure to DPM emissions was not conducted as a part of the County-sponsored study, but are considered in this section, below.

Metals Content of Particulate Matter

The STI study also included analysis of the metals content of particulate matter sampled (STI, 2005; STI, 2006) (Table 4.2-7). Filter samples were taken of ambient air in the vicinity of the Quarry, but emissions from Quarry operations, such as visible dust, were not directly sampled. Therefore, the origin of the pollutants found in the samples cannot be linked definitively to the Quarry. While this study indicated that the majority of the samples contained metals below detection limits and cancer and non-cancer benchmarks, some samples were found to exceed the cancer benchmarks for arsenic, chromium VI and nickel subsulfide. Laboratory analysis was performed for total chromium and did not speciate chromium III and chromium VI. Comparison of the measured total chromium levels to the chromium VI benchmark, which is the toxic form of chromium, cannot be made to determine the potential toxicity relative to chrome content.

It is highly unlikely that fugitive dust emissions from the Quarry contain chromium VI, since this substance does not occur naturally, but rather is a by-product of particular industrial processes that are not, and have never been a part of Quarry operations. Overall the data suggest that the metals content of the ambient air in the vicinity of the Quarry can occasionally exceed cancer benchmark concentrations, but the source of these pollutants cannot be determined from this study. Also, cancer benchmark levels are based on an assumed lifetime (long-term average)

exposure to TACs, and occasional short-term levels that exceed the benchmarks are generally not good indicators of actual long-term average levels, which are usually much lower. Although metals are constituents of diesel PM, the health effects values for diesel PM are used as surrogates for all toxic compounds, including metals, when calculating risk. Table 4.2-7 presents a summary of the metals analysis for particulate samples.

Crystalline Silica, Kaolinite, and Amorphous Silica

The toxicity of crystalline silica has been studied over several years, and questions have arisen about the health outcomes from exposure to crystalline silica. California Office of Health Hazard Assessment (OEHHA) has published a report that summarizes the toxicity of respirable crystalline silica from chronic exposure to the substance (OEHHA, 2005). The OEHHA report states that inhalation of crystalline silica initially causes respiratory irritation and an inflammatory reaction in the lungs. Chronic exposure can lead to deterioration of lung tissue. High levels of respirable crystalline silica, as have been experienced in certain work environments, have led to silicosis, which is a form of lung disease from occupational exposure to silica dust over a number of years. Silicosis causes slowly progressive fibrosis of the lungs and impairment of lung function.

The possible carcinogenicity of crystalline silica dust became a subject of considerable debate in the scientific community in the 1980s and 90s, and several epidemiological studies examined the association of lung cancer with exposure to crystalline silica (Gunel, et al, 1989, Costello et al, 1995, and Dong et al, 1995). These studies generally found a link to cancer for workers that experienced severe levels of silicosis. As a result, the National Institute for Occupational Safety and Health (NIOSH) declared crystalline silica to be a human carcinogen (NIOSH, 2002).

Another report (de Klerk and Musk, 1998) studied 2,297 surface and underground gold miners and found that lung cancer mortality was related to total cumulative silica dust exposure after adjustment for smoking and for the presence of bronchitis. However, the effect of cumulative silica dust exposure on lung cancer mortality was not significant after adjustment for smoking, bronchitis, and silicosis. The results of this study do not support a relationship between lung cancer and silica exposure, in the absence of silicosis.

Since the OEHHA report analyzed health outcomes from environmental exposure to crystalline silica, it assumed that chronic levels of crystalline silica would not be great enough to result in the formation of silicosis. It thus concluded that, based on studies, such as the de Klerk study, there is no statistical evidence for the formation of cancer in the absence of silicosis. OEHHA established only a chronic non-carcinogenic relative exposure level (REL), and it did not establish a carcinogenic toxicity factor for the substance.

The non-crystalline form of silica (amorphous silica) is far less toxic, since it usually does not cause the formation of scar tissue in the lungs.

**TABLE 4.2-7
METALS CONTENT OF SAMPLES FROM COUNTY-SPONSORED AIR QUALITY STUDY**

Sample	Beryllium ($\mu\text{g}/\text{m}^3$)	Vanadium ($\mu\text{g}/\text{m}^3$)	Chromium ^a ($\mu\text{g}/\text{m}^3$)	Cobalt ($\mu\text{g}/\text{m}^3$)	Nickel ^b ($\mu\text{g}/\text{m}^3$)	Arsenic ^d ($\mu\text{g}/\text{m}^3$)	Selenium ($\mu\text{g}/\text{m}^3$)	Cadmium ($\mu\text{g}/\text{m}^3$)	Antimony ($\mu\text{g}/\text{m}^3$)	Mercury ($\mu\text{g}/\text{m}^3$)	Lead ($\mu\text{g}/\text{m}^3$)
A	< LOQ ^c (0.00005)	0.000423	0.0523	< LOQ (0.0005)	0.0000677	<LOQ (0.00005)	0.000105	<LOQ (0.0001)	0.000155	<LOQ (0.0005)	0.000448
B	< LOQ (0.00005)	0.000158	0.0288	< LOQ (0.0005)	0.00161	<LOQ (0.00005)	<LOQ (0.0001)	<LOQ (0.0001)	0.000139	<LOQ (0.0005)	0.000378
C	< LOQ (0.00005)	0.000419	0.0456	< LOQ (0.0005)	< LOQ (0.00005)	0.000269	0.000205	<LOQ (0.0001)	0.000101	<LOQ (0.0005)	0.00182
D	< LOQ (0.00005)	0.000699	0.0389	< LOQ (0.0005)	0.000415	0.000224	0.000216	0.000121	0.000170	<LOQ (0.0005)	0.00150
E	< LOQ (0.00005)	0.000101	0.00888	< LOQ (0.0005)	< LOQ (0.00005)	<LOQ (0.00005)	<LOQ (0.0001)	<LOQ (0.0001)	0.0000802	<LOQ (0.0005)	0.000295
F	< LOQ (0.00005)	< LOQ (0.00005)	0.0452	< LOQ (0.0005)	< LOQ (0.00005)	<LOQ (0.00005)	<LOQ (0.0001)	<LOQ (0.0001)	< LOQ (0.00005)	<LOQ (0.0005)	0.0000813
G	< LOQ (0.00005)	0.00161	0.0326	< LOQ (0.0005)	0.000280	0.000103	0.000159	<LOQ (0.0001)	0.000186	<LOQ (0.0005)	0.000574
H	< LOQ (0.00005)	0.00213	0.00811	< LOQ (0.0005)	0.000626	0.000126	0.00118	<LOQ (0.0001)	0.000571	<LOQ (0.0005)	0.000809
I	< LOQ (0.00005)	0.0122	0.00832	< LOQ (0.0005)	0.00403	0.000180	0.00111	0.000115	0.000433	<LOQ (0.0005)	0.00273
J	< LOQ (0.00005)	0.00356	0.00749	< LOQ (0.0005)	0.00135	0.000157	0.000555	<LOQ (0.0001)	0.000532	<LOQ (0.0005)	0.00111
K	< LOQ (0.00005)	< LOQ (0.00005)	0.0105	< LOQ (0.0005)	0.000113	<LOQ (0.00005)	<LOQ (0.0001)	<LOQ (0.0001)	< LOQ (0.00005)	<LOQ (0.0005)	0.000598
L	< LOQ (0.00005)	0.00168	0.00840	< LOQ (0.0005)	0.000627	0.000108	0.000348	<LOQ (0.0001)	0.000147	<LOQ (0.0005)	0.000690
M	< LOQ (0.00005)	0.000355	0.00802	< LOQ (0.0005)	0.000300	0.000185	0.000226	<LOQ (0.0001)	0.0000969	<LOQ (0.0005)	0.00124
N	< LOQ (0.00005)	< LOQ (0.00005)	0.00803	< LOQ (0.0005)	< LOQ (0.00005)	0.0000542	<LOQ (0.0001)	<LOQ (0.0001)	< LOQ (0.00005)	<LOQ (0.0005)	0.0000615
O	< LOQ (0.00005)	0.000588	0.00626	< LOQ (0.0005)	0.000482	0.0000594	<LOQ (0.0001)	<LOQ (0.0001)	0.000148	<LOQ (0.0005)	0.000303

^a Bolded chromium concentrations exceed the cancer benchmark specific to hexavalent chromium only (0.0002 microgram per cubic meter). Additional testing would be necessary to determine the concentration of hexavalent chromium only for meaningful comparison to the cancer benchmark. See text discussion of chromium 3 and chromium 6.

^b Bolded nickel concentrations exceed the cancer benchmark for specific to nickel and its compounds (0.0002 microgram per cubic meter), including nickel subsulfide.

^c LOQ = Limit of Quantitation, which is the concentration at or above which quantitative results can be reported with a high degree of confidence.

^d Bolded arsenic concentrations exceed the cancer benchmark for arsenic (0.0002 microgram per cubic meter).

SOURCE: STI, 2006.

A study by a concerned neighbor of SRRQ (Warters, 2007) found that dust scrapings taken in 1994 and in 2004 from several sites in the vicinity of the Quarry and submitted for laboratory analysis contained up to 25.3 percent crystalline silica. This same study notes that the laboratory analysis of the collected surface dust samples also indicated the presence of kaolinite, which is the major constituent of kaolin clay. Kaolin clay, also called “china clay,” is also a common mineral, which is used in the manufacture of ceramic ware. Like crystalline silica, chronic exposure to respirable kaolin can have adverse health effects, particularly in causing a form of pneumoconiosis. The World Health Organization (WHO) notes that, “general population exposure to low concentrations of... kaolinite... and other clay minerals is ubiquitous. There is no information on the possible effects of such low-level exposure” (WHO, 2005, p. 5), but that “long-term exposure to kaolin causes the development of radiologically diagnosed pneumoconiosis in an exposure-related fashion.” Based on data from “china clay workers” in the United Kingdom, the WHO provides a rough estimate that the health risk effects of kaolin exposure are at least an order of magnitude less potent than quartz (crystalline silica) (*ibid*, p 6).

Concentrations of crystalline silica were analyzed in 15 of the PM-10 filters collected in 2004 as a part of the County-sponsored air quality study. Detectable quantities (greater than 0.5 micrograms per cubic meter) of crystalline silica were not found in any of the fifteen filters tested. Concentrations of amorphous silica were also analyzed in the 15 PM-10 filters collected in 2004. Only one of the 15 samples contained amorphous silica in excess of the detection limit, at a concentration of 0.6 micrograms per cubic meter, which is well below the federal relative exposure level (REL) for amorphous silica of 6,000 micrograms per cubic meter. Because this study sampled ambient air in the vicinity of SRRQ, but did not directly sample emissions from Quarry operations, the source of the silica cannot be determined from this study.

Laboratory Analysis of Rock and Soil Samples

In November and December 2007, ESA geologists collected rock and soil samples from various locations at and near the active mining areas to characterize source material that could potentially become airborne as fugitive dust. In addition to potential sources associated with mining activities, dust emission sources could be associated with McNear’s Brickyard, or from naturally occurring rock outcrops where surfaces have been sufficiently weathered into fine grains that are capable of being entrained into the atmosphere through wind activity; samples were also collected from these sources. A total of thirteen samples were collected from various areas at the project site itself. Three samples were collected from McNear’s Brickyard, and three samples were collected from outside these two facilities near residential housing and along North San Pedro Road.

Collected samples were submitted to state certified laboratories for crystalline silica, metals, and asbestos analyses. All samples were submitted for crystalline silica analysis using X-ray diffraction; and a subset of samples were submitted for metals analysis using Environmental Protection Agency (EPA) Method 6020A, and for asbestos analysis using EPA Method 600/R-93/116. Sample locations are illustrated on Figure 4.2-2 and a description of each sample location



SOURCE: ESA, 2007; DigitalGlobe, 2007

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Figure 4.2-2
Approximate Locations of
Soil and Rock Samples

and requested laboratory analysis is outlined in Table 4.2-8a. Analytical results for crystalline silica content and metals are summarized in Table 4.2-8b and 4.2-8c, respectively. Asbestos was not detected above the laboratory detection limit of 1% using a visual area estimation technique in the eight samples submitted for analysis.

Crystalline silica is a polymorphic mineral and occurs in three primary forms: quartz, cristobalite, and trypidite. Analytical results of the X-ray diffraction analysis indicate that the samples collected from the rock quarry, brickyard, and nearby residential neighborhood contain crystalline silica in the form of alpha-quartz, and that there are no discernible amounts of crystalline cristobalite or trypidite. Quartz is the second most common mineral on the earth's surface and is a large component in the composition of sandstones, such as the graywacke formation of the Franciscan Complex. The composition of quartz identified in the samples collected from the Quarry ranged from 40% to 60%, and from 40% to 65% in the samples collected from other locations. Other minerals that were common to all the samples include orthoclase and plagioclase (feldspars), mica and illite, kaolinite, and calcite.

The following metals were detected in the eight samples collected at and in the vicinity of the Quarry: arsenic, barium, beryllium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, vanadium, and zinc. Additionally, antimony and selenium were detected in one sample collected from the Quarry, and antimony was detected in the sample collected from McNear's Brickyard. To facilitate the evaluation of the results of the samples collected for metals analysis, the data were compared with the Environmental Screening Levels (ESLs) developed by the Regional Water Quality Control Board (RWQCB, 2005) for residential soils. The ESLs are human health-based screening criteria and concentrations of metals below the ESLs are considered to be below levels of health concern. In addition to this initial screening of the analytical results, a Human Health Risk Assessment was conducted using the analytical results of samples collected in November and December 2007 for the evaluation of risk associated with inhalation pathways, as discussed below.

Of the various metals detected in the eight samples submitted for analysis, only arsenic exceeded the ESL screening criteria. Arsenic is a naturally occurring element that is also associated with some industrial processes such as application of herbicides and the use of chemically treated woods. Concentrations of arsenic in soils depends on the geology of the source rock, and the industrial use of the site. The concentration of arsenic detected in rock and soil samples collected in November and December 2007 ranged from 2.5 milligrams per kilogram (mg/kg) in a sample collected from the Quarry to 16 mg/kg in the sample collected from a stock pile at McNear's Brickyard. Based on the historical uses of the project site, the arsenic detected in these samples is likely due to naturally occurring arsenic. The results of the laboratory analysis are included in Appendix N and summarized in Table 4.2-8a, b, and c. The results are incorporated into the Health Risk Analysis discussed under Impacts and Mitigation Measures, below.

TABLE 4.2-8a
SOIL AND ROCK SAMPLE LOCATION, DESCRIPTION, AND REQUESTED LABORATORY ANALYSES

Sample Area	Sample Location	Description	Requested Laboratory Analyses
San Rafael Rock Quarry	South Hill-1	Active South Hill dig site	XRD
	South Hill-2	Shale and secondary quartz	XRD
	South Hill-3	Representative working floor	XRD
	South Hill 4	Bulk rind representing loose over-burden	XRD; Metals; Asbestos
	South Hill 5	Fine shaving material from drilling	XRD; Metals; Asbestos
	South Hill-6	Fine shaving material from drilling	XRD
	Bag House -1	Dust fines from screen deck	XRD; Metals; Asbestos
	Bag House-2	Dust fines; assume air born, collected from top of equipment	XRD
	Secondary Stockpile	3/16 by 0 sieve, asphalt plant stockpile	XRD
	North Brick-1	Pond fines	XRD; Metals; Asbestos
	Quarry Bowl-1	Active quarry bowl dig site	XRD
	Quarry Bowl-2	Active quarry bowl dig site	XRD
	Quarry Bowl-Floor	Representative working floor	XRD; Metals; Asbestos
McNear's Brickyard	Brickyard-Stockpile-1	Stock pile with fines	XRD; Metals; Asbestos
	Brickyard-Stockpile-2A	Stockpile with fines; soil received from various location in Marin	XRD
	Brickyard-Stockpile-2B	Stockpile with fines; soil received from various location in Marin	XRD
Residential/Background	Gutter-1	Street gutter on Point San Pedro Road just outside entrance to brickyard and quarry	XRD
	Heritage Drive	Weathered rock in residential neighborhood	XRD; Metals; Asbestos
	N. San Pedro Road	Weathered rock near residential neighborhood	XRD; Metals; Asbestos

NOTES:

XRD = X-ray Diffraction

USEPA = United States Environmental Protection Agency

Metals analysis performed in accordance with USEPA Method 6020A

Asbestos analysis performed in accordance with USEPA Method 600/R-93/116 or 600/M4-82-020

**TABLE 4.2-8b
MINERALOGICAL PERCENT COMPOSITION OF SOIL AND ROCK SAMPLES**

Sample ID	Sample Date	Quartz	K-feldspar & Na/Ca Feldspar	Mica/Illite	Kaolinite	Chlorite/ Smectite	Calcite
South Hill-1	11/07/2007	~50	~20	~15	~5	~5	~5
South Hill-2	11/07/2007	~45	~20	~15	~5	~5	~10
South Hill-3	11/07/2007	~45	~25	~15	~5	~5	~5
South Hill-4	11/07/2007	~55	~15	~10	~5	~3	~2
South Hill-5	11/07/2007	~55	~15	~10	~5	~3	~2
South Hill-6	11/07/2007	~50	~20	~5	~5	~3	~7
Bag House-1	11/07/2007	~50	~30	~10	~5	~5	<1
Bag House-2	11/07/2007	~55	~20	~15	~5	~5	<1
Secondary Stockpile	11/07/2007	~60	~20	~10	~5	~5	<1
North Brick-1	11/07/2007	~55	~20	~10	~3	~5	~7
Quarry Bowl-1	12/19/2007	~50	~20	~10	~10	~5	~5
Quarry Bowl-2	12/19/2007	~40	~25	~10	~10	~5	~10
Quarry Bowl-Floor	12/19/2007	~50	~20	~10	~10	~5	~5
Brickyard-Stockpile-1	12/19/2007	~60	~15	~5	~10	~10	<1
Brickyard-Stockpile-2A	12/19/2007	~65	~20	~5	~5	~5	<1
Brickyard-Stockpile-2B	12/19/2007	~65	~10	~5	~5	~15	<1
Gutter-1	11/07/2007	~50	~20	~15	~5	~5	~5
Heritage Drive	11/07/2007	~50	~25	~15	~5	~2	~3
N. San Pedro Rd	11/07/2007	~40	~30	~15	~5	~10	<1

NOTE: ~ = Approximately

**TABLE 4.2-8c
INORGANIC CHEMICAL CONCENTRATION OF SOIL AND ROCK SAMPLES**

Sample ID	South Hill 4 (soil)	South Hill 5 (soil)	Bag House -1 (powder)	North Brick-1 (soil)	Quarry Bowl- Floor	Brick Yard- Stockpile 1	Heritage Drive (soil)	N. San Pedro Rd (soil)	Screening Criteria ¹
Date Sampled:	11/07/2007	11/07/2007	11/07/2007	11/07/2007	12/19/2007	12/19/2007	11/07/2007	11/07/2007	--
Antimony	0.67	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	NC
Arsenic	6.8	2.5	4.7	4.1	2.8	16	4.1	4.3	0.06
Barium	360	140	520	700	390	410	120	120	NC
Beryllium	1.2	0.8	1.1	0.83	0.62	0.59	0.65	0.51	1,100
Cadmium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	1.7
Chromium	9.2	9.3	16	11	12	56	15	9.4	NC ²
Cobalt	22	4.9	12	7.1	5.3	14	4.2	3.4	910
Copper	12	7.4	13	11	8.1	42	11	16	NC
Lead	24	9	14	10	7.7	19	9.3	9.7	NC
Mercury	4.2	0.085	2.1	3.4	1.9	0.17	0.13	0.27	NC
Molybdenum	0.72	0.87	0.85	0.64	2.5	0.9	<0.5	<0.5	NC
Nickel	27	11	26	18	14	67	14	11	9,800
Selenium	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NC
Silver	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NC
Thallium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NC
Vanadium	26	19	29	21	14	73	27	16	NC
Zinc	60	30	58	47	38	68	29	33	NC

NOTES:

< = analyte not detected above the laboratory reporting limit.

NC = no carcinogenic level identified

¹ San Francisco Bay Regional Water Quality Control Board, Residential Exposure Screening Levels, Carcinogens (Risk = 10-6) (Table K-1, February 2005)² Trivalent chromium is not identified as a carcinogen; hexavalent chromium cancer risk is 16 mg/kg.

Acid digestion extraction was used for all samples

McNear’s Brickyard Operations

McNear’s Brickyard operates, via lease, on the NW Quadrant of the project site. Kiln operations from the Brickyard result in emissions of hydrogen fluoride (HF), a substance identified as a toxic air contaminant by the state of California. HF is not a known carcinogen, but exposure to high levels of fluoride can result in bones that may be more fragile and brittle and there may be a greater risk of breaking the bone. HF is irritating to the skin, eyes, and mucous membranes, and inhalation may cause respiratory irritation or hemorrhage. Systemic effects can occur from all routes of exposure and may include nausea, vomiting, gastric pain, or cardiac arrhythmia.

In December of 2005 the BAAQMD completed a health risk analysis to assess the incremental health risks to workers and at nearby sensitive receptors resulting from HF emissions of the Brickyard. Hazard indices were calculated based on modeled emissions from the Brickyard and local meteorology. Resulting hazard indices for both chronic and acute non-cancer effects were found to be less than BAAQMD significance standards for public notification requirements for both off-site receptors and on-site workers (BAAQMD, 2005c).

San Rafael Rock Quarry Greenhouse Gases Emissions

GHG emissions resulting from current Quarry operations, primarily carbon dioxide, are the result of fuel combustion of trucks, tugboats, and earthmoving equipment, as well as worker commute trips. An estimate of GHG emissions in CO₂ equivalent units are presented in Table 4.2-9.

**TABLE 4.2-9
EXISTING EMISSIONS OF GREENHOUSE GASES FROM QUARRY OPERATIONS
(assuming current level of operations)**

Emission Source	Emissions (tons eCO ₂ per year)			TOTAL
	CO ₂	CH ₄	N ₂ O	
Exhaust Emissions from On-Site Excavation and Transport Equipment	2,287	5	9	<u>2,292</u> 2,301
Generator	1,453	<u>22</u> 20	--	<u>1,475</u> 1,474
Off-Site Truck Emissions	13,384	9	--	13,393
Worker vehicle trips	200	1	9	209
Barge (Tugboat) Emissions ¹	<u>21,840</u> <u>15,288</u>	<u>70</u> <u>49</u>	<u>1,371</u> <u>960</u>	<u>23,281</u> <u>16,297</u>
Total Quarry Operational GHG Emissions	<u>39,164</u> <u>32,612</u>	<u>106</u> <u>84</u>	<u>1,380</u> <u>979</u>	<u>40,650</u> <u>33,674</u>

¹ Barge emissions reflect use of distillate fuel.

SOURCE: ESA

Sensitive Receptors

Some receptors are considered more sensitive than others to air pollutants. The reasons for greater sensitivity than average include pre-existing health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution, because vigorous exercise associated with recreation places a high demand on the human respiratory function.

The nearest sensitive receptors to the site include residential uses and recreational site users. The nearest existing residential developments are the residences along Heritage Drive and Marin Bay Park Court. These residences are approximately 150 feet from the fenceline of the Quarry, 1,200 feet from the Main Quarry Bowl, and about 300 feet from the nearest-planned reclamation activities.

Impacts and Mitigation Measures

Significance Criteria

Consistent with Appendix G of the California Environmental Quality Act Guidelines (CEQA *Guidelines*), a project would generally have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people; or
- Cause a significant health risk increase above the thresholds of the BAAQMD relative to emissions of toxic air contaminants.

In addition, consistent with Appendix N of the Marin County Environmental Impact Review Guidelines, effects of a project would be considered significant if they would do any of the following:

- Cause or contribute substantially to existing or projected air quality violations;

- Result in exposure of sensitive receptors (i.e. individuals with respiratory diseases, the young, the elderly) to substantial pollutant concentrations;
- Release toxic air contaminants (TACs) that would cause a health risk above the Air Pollution Control District's level of significance.

In addition to the criteria noted above, CEQA *Guidelines* Section 15125(d) states that an Environmental Impact Report (EIR) shall discuss “any inconsistencies between a proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the applicable air quality attainment or maintenance plan (or State Implementation Plan). . . .”

The BAAQMD has published a set of recommendations that provide specific guidance on evaluating projects under CEQA relative to the above general criteria (BAAQMD, 1999). The BAAQMD has established significance criteria for criteria air pollutants, toxic air contaminants, and odors. These criteria are discussed below.

For temporary construction-phase impacts, the BAAQMD recommends a qualitative approach that focuses on the dust control measures that would be implemented. If appropriate mitigation measures are implemented to control PM-10 emissions, the impact from construction would be less than significant. However, for the purposes of assessing air quality impacts from Quarry reclamation activities, the BAAQMD considers such activities to be operational in nature and recommends that equipment exhaust and fugitive dust be quantified and compared to thresholds discussed below (Tholen, 2007).

For some pollutants, dispersion modeling is conducted to estimate pollutant concentrations that can then be compared directly to their corresponding ambient air quality standards. However, since air pollutant concentration modeling is not appropriate or feasible for all pollutants (particularly those associated with regional impacts rather than local impacts), emissions-based thresholds are used to supplement the above general CEQA criteria. For evaluating operational-phase emissions, the BAAQMD recommends that local agencies consider individual development projects exceeding the following thresholds to have a significant impact on the environment:

- Cause a net increase in pollutant emissions of reactive organic gases (ROG), NO_x, or PM-10 exceeding 80 pounds per day or 15 tons per year.
- Cause a net increase in carbon monoxide emissions exceeding 550 pounds per day, reduce roadway Level of Service for intersections operating at Level of Service D, E or F (see Section ~~4.103-10~~, Transportation and Traffic), cause a reduction of intersection Level of Service to D, E or F, or increase traffic volumes on nearby roadways by 10 percent or more, and violate state CO concentration standards, as determined by the modeling of CO emissions. The level of significance of CO emissions from mobile sources is determined by modeling the ambient CO concentration under project conditions and comparing the resultant 1- and 8-hour concentrations to the respective state CO standards of 20.0 and 9.0 parts per million.

With respect to odors, the BAAQMD's significance criteria are more subjective and are based on the number of odor complaints generated by a project. Generally, the BAAQMD considers any

project with the potential to frequently expose members of the public to objectionable odors to cause a significant impact. For comparative purposes, the BAAQMD considers odor impacts for projects located near an existing source of odors to be significant if there has been either: 1) more than one confirmed complaint per year averaged over a three-year period; or 2) three unconfirmed complaints per year averaged over a three-year period.

Lastly, the BAAQMD recommends that cumulative air quality effects be discussed with reference to the consistency of a project to the latest Clean Air Plan, currently the 2005 Ozone Strategy. BAAQMD recommendations are used herein to identify significant effects of the project and significant cumulative effects.

Significance Criteria for TACs

The significance of TAC emissions from the project is dependent on the chance of contracting cancer from exposure to the TACs or of having adverse health effects from exposure to non-carcinogenic TACs.

Cancer Risk

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chances in one million of contracting cancer, for example one cancer case among one million people exposed. Incremental cancer risks are determined by summing the individual risk for each TAC.

A project is considered to have a significant cancer risk if the incremental cancer risk at a receptor exceeds 10 in a million. This is consistent with regulation under AB 2588 as well as Proposition 65, both of which require public notification if the incremental risk equals or exceeds 10 in a million. BAAQMD CEQA *Guidelines* also recommend that the cancer risk significance threshold be 10 in a million. The incremental risk from exposure to a given toxic air contaminant (TAC) is calculated by multiplying the concentration (or dosage level) of the given TAC by its specific unit risk factor or potency slope. The unit risk factor or potency slope of a TAC is derived from epidemiological studies, and the published values are based on the assumption that a person would be exposed to the given TAC at that dosage constantly for 70 years or for the life of the project.

Non-Cancer Health Risk

Health risks for each non-carcinogenic TACs are determined using a Hazard Index (HI), which is the ratio of the predicted exposure concentration to a threshold level that could cause adverse health effects other than cancer, as established by OEHHA. The ratio (HI) of each non-carcinogenic substance is added to the calculated Hazard Indices of the other non-carcinogens to produce an overall HI. If the overall HI exceeds one (1), then the impact would be significant. The HI significance threshold of greater than one is defined in the BAAQMD CEQA *Guidelines* and is consistent with the value requiring public notification in the AB 2588 regulation and in Proposition 65.

Significance Criteria for Greenhouse Gas Emissions

The Marin County Greenhouse Gas Reduction Plan adopted by the Board of Supervisors in October 2006 sets out policies to help achieve the County's GHG emissions targets. The target has been set to reduce GHG emissions by 15 to 20 percent below 1990 levels by the year 2020 for internal government operations and 15 percent Countywide. This target exceeds the State target contained in AB 32, which is to reduce emissions to 1990 levels by 2020. It is the overall County Policy of the 2007 Countywide Plan Update to apply the GHG Reduction Plan Policies as applicable to all land use planning and development projects in Marin. This EIR therefore uses the 15 percent reduction target as a standard for establishing a significance threshold for GHG emissions. If the project will result in GHG emissions greater than 15 percent below 1990 levels, the impact is considered significant. The following situations would exceed this threshold:

- Project GHG emissions are from a source that did not exist in 1990, such as a new development;
- Project GHG emissions are from a source that did exist in 1990, but emissions would be greater than the 1990 emission level from that source minus 15 percent.

In addition, if the project does not include feasible measures to reduce GHG emissions, regardless of their level in relation to 1990 levels, the impact is considered significant.

Impacts of the Amended Reclamation Plan

Impact R4.2-1: The proposed Amended Reclamation Plan would result in an increase in daily emissions of criteria air pollutants as a result of reclamation activities being conducted simultaneously with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. This increase in daily emissions would exceed the Bay Area Air Quality Management District-established significance thresholds for reactive organic gases, nitrogen oxides, carbon monoxide, and particulate matter equal to or less than 10 microns (Significant).

The proposed amended reclamation plan would result in reclamation activities for Phases 1, 2, 3, and part of Phase 4 being conducted during the remaining operational life of the Quarry, instead of at the end of quarrying activities, as contemplated in ARP82. These reclamation activities would result in an increase in daily emissions rates of criteria pollutants, including ozone precursors and PM-10 in an air basin that is designated as non-attainment with respect to state and federal ozone standards and state PM-10 standards. Appendix N of the Marin County Environmental Impact Review Guidelines identifies any project that would cause or contribute substantially to existing or projected air quality violations to have a significant impact on air quality.

Emissions resulting from reclamation activities would include fugitive particulate emissions (including PM-10 and PM-2.5) from earthmoving and disturbance and truck travel on unpaved Quarry roads, as well as criteria pollutants from the exhaust of trucks and equipment used in earthmoving. Reclamation activities would be separated into four phases with portions of the

fourth and final phase being conducted after the end of mining operations. As indicated in the Project Description, each reclamation stage would occur over an approximately 5 year period. Additionally, SRRQ proposes to limit disturbance of neighbors by conducting reclamation grading activities only during an 8-10 week period during the dry season of each year.

Daily pollutant emissions resulting from phases 1 to 3 of reclamation were calculated based on emission factors published by the USEPA, BAAQMD and the South Coast Air Quality Management District and data sheets for these calculations are presented in Appendix C of this document, and are considered new emissions not contemplated in ARP82, since that plan contemplated no reclamation activities during the operational life of the Quarry.. Because a portion of the grading conducted under Phase 4 would occur after the cessation of mining, phase 4 reclamation activities are considered a change from ARP82 only to the extent that they differ from those proposed in ARP82. Consequently, Phase 4 emissions are addressed separately in the following impact statement.

The emissions from Phases 1 through 3 are presented in Table 4.2-10 and assume the cut and fill volumes presented in Table 3-3 and activity over an eight week period for each of five consecutive years. These emission estimates include reclamation activities not previously proposed under ARP82 including: mixing of pond fines with overburden material in Phase 1, construction of the berm in the NE Quadrant in Phase 1, construction of the surcharge berm in the NW Quadrant in Phase 2, and the stockpiling of topsoil in the NW Quadrant in all phases.

The increased daily emissions shown in Table ~~4.2-10~~^{4.2-9} indicate that for reclamation Phases 1, 2 and 3, the increase in daily emissions of ROG, NOx, PM-10 and CO would all be greater than the significance standards established by the BAAQMD. Consequently, the proposed ARP would be considered to result in a significant air quality impact resulting from increases in daily emission rates as compared to ARP82.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.2-1a: The project applicant has recently initiated the use of biodiesel fuel in all quarry rolling stock. Biodiesel is the only alternative fuel for which a detailed emissions evaluation has been submitted to the United States Environmental Protection Agency (USEPA). The effectiveness of emission reduction resulting from the use of biodiesel is dependant upon the percent of biodiesel contained in the mixture (USEPA, 2002). The most common blend, and that currently used at SRRQ, is a 20 percent biodiesel and 80 percent conventional diesel (B-20). B-20 will reduce particulate and CO emission by approximately 12 percent, and reduce hydrocarbon emissions by approximately 20 percent. Use of biodiesel may increase or decrease NOx emissions (McCormick et al, 2006).

Mitigation Measure R4.2-1b: SRRQ has already upgraded SRRQ's entire fleet of off-road diesel equipment to USEPA Tier 3 standards, ahead of regulatory requirements that at least 10 percent of the fleet be upgraded each year. SRRQ also plans to upgrade its tug boat fleet to Tier 2 standards prior to the end of 2008.

**TABLE 4.2-10
INCREASES IN EMISSIONS OF CRITERIA AIR POLLUTANTS FROM THE ARP
(without mitigation measures)**

Emission Source	Emissions (pounds per day)			
	CO	ROG	NO _x	PM-10 ^a
Phase 1				
Exhaust Emissions from Earthmoving Equipment	527	35	162	8.4
Exhaust Emissions from On-Site Truck Travel	164	54	506	19
Fugitive Dust Emissions from Off-road Truck Travel Associated with Cut and Fill Operations	--	--	--	534
Fugitive Dust Emissions from Material Loading and Unloading Associated with Cut and Fill Operations	--	--	--	12
TOTAL QUANTIFIED PHASE 1 EMISSIONS	691	89	668	573
BAAQMD Significance Criteria	550	80	80	80
Phase 2				
Exhaust Emissions from Earthmoving Equipment	567	38	174	9.0
Exhaust Emissions from On-Site Truck Travel	139	47	387	14
Fugitive Dust Emissions from Off-road Truck Travel Associated with Cut and Fill Operations	--	--	--	574
Fugitive Dust Emissions from Material Loading and Unloading Associated with Cut and Fill Operations	--	--	--	13
TOTAL QUANTIFIED PHASE 2 EMISSIONS	706	85	561	610
BAAQMD Significance Criteria	550	80	80	80
Phase 3				
Exhaust Emissions from Cut and Fill Equipment	567 <u>720</u>	38 <u>48</u>	174 <u>221</u>	9.0 <u>11.5</u>
Exhaust Emissions from On-Site Truck Travel	158	51	335	12
Fugitive Dust Emissions from Off-road Truck Travel Associated with Cut and Fill Operations	--	--	--	574 <u>729</u>
Fugitive Dust Emissions from Material Loading and Unloading Associated with Cut and Fill Operations	--	--	--	13 <u>17</u>
TOTAL QUANTIFIED PHASE 3 EMISSIONS	725 <u>878</u>	89 <u>99</u>	509 <u>556</u>	608 <u>769</u>
BAAQMD Significance Criteria	550	80	80	80

a. Fugitive dust emissions of PM-10 are uncontrolled and do not account for water application to site areas, which can reduce emissions by 70 percent.

SOURCE: Environmental Science Associates

Mitigation Measure R4.2-1c: SRRQ already implements several measures to control dust. These will be continued under the project:

- All trucks leaving the Quarry shall be washed down, including the undercarriage, prior to entering Point San Pedro Road (except trucks transporting asphalt). The wash down and adjoining areas shall be paved to minimize tracking of dust and dirt. Point

San Pedro Road will be swept up to two times per day, except on rain days, when no sweeping will occur, subject to the approval of the City of San Rafael;

- The Quarry shall maintain all required erosion control measures and stormwater management plans, and shall keep current and comply with all permits required by the Regional Water Quality Control Board; and
- The Quarry shall maintain all dust abatement devices, and shall keep current and comply with all permits required by the BAAQMD.

Mitigation Measures Identified in This Report

Mitigation Measure R4.2-1d: The project sponsor shall be required to continue existing emission reduction practices, including use of alternative fuels, use of low-emission diesel equipment, and dust abatement measures.

Mitigation Measure R4.2-1e: The applicant shall implement additional dust abatement measures identified by BAAQMD as feasible dust control, during all reclamation grading activities:

- Cover all trucks hauling soil, sand, and other loose materials as a part of reclamation activities, or require such trucks to maintain at least two feet of freeboard between the top of the material and top of truck;
- Pave, apply water at a minimum three times daily in dry weather, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at the Quarry;
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the Quarry;
- Hydroseed, apply non-toxic soil stabilizers, or water to inactive reclamation areas (previously graded areas inactive for ten days or more);
- Limit traffic speeds on unpaved roads to 15 miles per hour;
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
- Replant vegetation in disturbed areas as soon as the growing seasons dictates;
- Install wind breaks or plant trees/vegetative wind breaks at the windward sides of the reclamation areas until such time as the vegetation is established;
- Suspend reclamation-related excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour; and
- Limit the area subject to reclamation-related excavation, grading and other construction activity at any one time.

Mitigation Measure R4.2-1f: The project applicant shall keep all off-road equipment well-tuned and regularly serviced to minimize exhaust emissions, and shall establish a regular and frequent check-up and service/maintenance program for all operating equipment at the Quarry.

Mitigation Measure R4.2-1g: To further reduce emissions from off-road diesel equipment, the applicant shall fuel on-site diesel-powered mobile equipment used in reclamation activities with a minimum 80 percent biodiesel blend (B-80) or use other equipment and/or fuel that achieves the same reduction in particulate (PM-10) and CO emissions.

Mitigation Measure R4.2-1h: Off-road diesel equipment operators shall be required to shut down their engines rather than idle for more than 5- minutes, unless such idling is necessary for proper operation of the vehicle.

Mitigation Measure R4.2-1i: The applicant will acquire BAAQMD off-site emission offset credits in sufficient quantity to reduce emissions from reclamation grading to levels below significance thresholds.

Mitigation Measure R4.2-1j: The applicant will limit on-site mining operations on days on which reclamation grading activities are performed, such that total emissions from the site are not increased above significance thresholds. To ensure the effectiveness of this measure, the Quarry will be required to maintain and report to the BAAQMD and the County Public Works Department a record of reclamation and operations activities, with an estimate of emissions from each. Since emissions related to reclamation grading were not quantified in ARP82, and since simultaneous reclamation and mining was not contemplated in ARP82, the baseline for combined emissions is the current level of emissions for mining operations only, as shown in Table 4.2-5. The limit for combined emissions from mining and reclamation will therefore be the current emissions levels from mining operations plus the BAAQMD's threshold values for criteria pollutants, as shown in Table 4.2-10.1.

TABLE 4.2-10.1
ALLOWABLE EMISSIONS LEVELS FOR SIMULTANEOUS MINING AND RECLAMATION
(TABLE IS NEW IN THIS FINAL EIR)

Emission Source	Emissions (pounds per day)			
	CO	ROG	NO _x	PM-10
Total Existing Quarry Operational Emissions (from Table 4.2-5)	410	72	1,797	464.4
BAAQMD Significance Criteria for Increased Emissions	550	80	80	80
Maximum Allowable Emissions from Combined Operations and Reclamation Activities	<960	<152	<1,877	<544.4

SOURCE: Table 4.2-5, BAAQMD

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.2-1: The Marin County Public Works Department will be responsible for monitoring implementation of all the above mitigation measures, which will become conditions of approval of the project. Monitoring will occur during periodic inspections of the Quarry. The BAAQMD is the administrator of the emissions credit program, and will be responsible for ensuring compliance with the terms of participation in this program.

Level of Significance after Mitigation

Given current technologies, conversion of diesel equipment to USEPA Tier 3 standards, which SRRQ has already implemented for on-site mobile diesel equipment used in mining operations, would achieve a maximum NO_x reduction of only about 50 percent. It is therefore unlikely that ~~the m~~ Mitigation m Measures 4.2-1b, d, f, and h identified above could achieve an 85-90 percent reduction in NO_x emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 80 pounds per day significance threshold. In order to reduce NO_x emissions to below significance, it will be necessary for the Quarry to implement either Mitigation Measure R4.2-1i or j.

Use of B-20 biodiesel (Mitigation Measure R4.2-1a) would reduce emissions of ROG to less than significance thresholds of 80 pounds per day, reduce CO emissions, and marginally reduce equipment exhaust emissions of PM-10. Increasing the biodiesel blend to B-80 or use of other alternative fuels (Mitigation Measure R4.2-1g) would further reduce PM-10 emissions from mobile equipment: use of B-80 results in approximately 40 percent reduction in PM-10 and CO, and approximately 50 percent reduction in ROG emissions (McCormick et al, 2006); CO emissions would be reduced to less than significant. Use of higher biodiesel blends may, however, increase NO_x emissions.

Conditions of the BAAQMD permit apply to stationary sources that would presumably not be involved in proposed reclamation processes. Therefore, no emissions reductions would be realized from implementation of these conditions relative to the calculated emissions resulting from the ARP.

Implementation of dust control measures (Mitigation Measures R4.2-1c and R4.2-1e) is expected to result in a decrease in fugitive dust emissions of 70%. Even with this reduction, daily PM-10 emissions during reclamation grading would exceed significance thresholds in each reclamation phase. In order to reduce PM-10 emissions to below significance, it will be necessary for the Quarry to implement either Mitigation Measure R4.2-1i or j.

~~Other mitigation measures were considered, including use of emission offset credits. These were found not to be feasible; however, the BAAQMD emissions banking program can be used only to offset stationary source emissions.~~

~~Therefore, even with the implementation of all feasible mitigation measures, PM-10 and NOx emissions will remain significant and should be considered an unavoidable consequence of project approval. The combination of Mitigation Measures R4.2-1a-h, with Mitigation Measures R4.2-1i and j, will reduce this impact to less than significant.~~

Impact R4.2-2: Phase 4 of the 2004 Amended Reclamation Plan would include cut and fill activities that were not included in 1982 Amended Reclamation Plan. These new reclamation activities would result in emissions of criteria pollutants that would exceed Bay Area Air Quality Management District significance thresholds (Significant).

Proposed Phase 4 reclamation includes several activities that were not contemplated in ARP82. These activities include the demolition of McNear's Brickyard buildings, placement of fill to raise McNear's Brickyard site, removal of the surcharge berm, and removal of the NE Quadrant berm and the pond fines stockpile. As shown in Table 3-3 in Chapter 3, Project Description, these activities would require the cut and fill of approximately 865,500 cubic yards of soil.

Emissions resulting from Phase 4 reclamation activities would include fugitive particulate emissions (including PM-10 and PM-2.5) from earthmoving and disturbance and truck travel on unpaved Quarry roads, as well as criteria pollutants from the exhaust of trucks and equipment used in earthmoving. As with the first three reclamation phases, Phase 4 reclamation would occur over an approximately five-year period (see Table 3-2 in Chapter 3, Project Description). SRRQ proposes to limit disturbance of neighbors by conducting reclamation grading activities only during an 8-10 week period during the dry season of each year.

Daily pollutant emissions resulting from Phase 4 reclamation not contemplated in ARP82 were calculated based on emission factors published by the USEPA, BAAQMD and the South Coast Air Quality Management District and data sheets for these calculations are presented in Appendix C of this document.

The increased daily emissions shown in Table 4.2-11 indicate that in Phase 4 reclamation, the increase in daily emissions of ROG, NOx, PM-10 and CO would all be greater than the significance standards established by the BAAQMD. Appendix N of the Marin County Environmental Impact Review Guidelines identifies any project that would cause or contribute substantially to existing or projected air quality violations as having a significant impact on air quality. Consequently, Phase 4 of the proposed ARP would be considered to result in a significant air quality impact resulting from increases in daily emission rates as compared to those calculated for this EIR for ARP82.

**TABLE 4.2-11
INCREASES IN EMISSIONS OF CRITERIA AIR POLLUTANTS FROM THE PHASE 4 RECLAMATION
(without mitigation measures)**

Emission Source	Emissions (pounds per day)			
	CO	ROG	NO _x	PM-10
Phase 4				
Exhaust Emissions from Earthmoving Equipment	4,090 <u>1,095</u>	73.0	336	17.4
Exhaust Emissions from On-Site Truck Travel	150	43	225	8
Fugitive Dust Emissions from Off-road Truck Travel Associated with Cut and Fill Operations	--	--	--	1,108
Fugitive Dust Emissions from Material Loading and Unloading Associated with Cut and Fill Operations	--	--	--	25
TOTAL QUANTIFIED PHASE 4 EMISSIONS	4,240 <u>1,245</u>	116	561	1,158
BAAQMD Significance Criteria	550	80	80	80

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.2-2a: Mitigation measures R4.2-1a, b, and c apply to Phase 4 as well.

Mitigation Measures Identified in this Report

Mitigation Measure R4.2-2b: Implement Mitigation Measures R4.2-1d through R4.2-1j~~h~~ for Phase 4.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.2-2: The Marin County Public Works Department will be responsible for monitoring implementation of all the above mitigation measures. This will occur during periodic inspections of the Quarry.

Level of Significance after Mitigation

The increase in NO_x emissions from the off-road equipment use and on-site truck travel would be 561 pounds per day (Table 4.2-11) from new Phase 4 reclamation activities. Given current technologies, converting or modifying diesel equipment could achieve a maximum NO_x reduction of only about 50 percent. It is therefore unlikely that either Mitigation Measure R4.2-1i or R4.2-1j will be necessary to ~~the mitigation measures identified above could~~ achieve an 85-90 percent reduction in NO_x emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 80 pounds per day significance threshold.

The project applicant has already converted all rolling stock using the facility to B-20 biodiesel. Use of biodiesel would reduce emissions of ROG to less than significance thresholds of 80 pounds per day and marginally reduce equipment exhaust emissions of PM-10. Increasing the use

of biodiesel to B-80 (Mitigation Measure R4.2-1g) would further reduce diesel particulates and CO emissions (by about 40%, compared to conventional diesel; McCormick et al, 2006), but not enough to reduce CO beneath the significance threshold.

Implementation of dust control measures (Mitigation Measures R4.2-1c and R4.2-1e) is expected to result in a decrease in fugitive dust emissions of about 70 percent, compared to emissions without dust control. Even with this reduction, PM-10 emissions would exceed significance thresholds in Phase 4 of reclamation. In order to reduce PM-10 emissions to below significance, it will be necessary for the Quarry to implement Mitigation Measures R4.2-1i or j for Phase 4 reclamation grading as well.

~~Other mitigation measures were considered, including use of emission offset credits. These were found not to be feasible, however: the BAAQMD emissions banking program can be used only to offset stationary source emissions.~~

~~Therefore, even with the implementation of all feasible mitigation measures, CO, PM-10, and NOx emissions will remain significant and should be considered an unavoidable consequence of project approval.~~

The application of Mitigation Measures R4.2-1a-h, with Mitigation Measures R4.2-1i and j, to Phase 4 reclamation grading will reduce this impact to less than significant.

Impact R4.2-3: Reclamation activities will generate greenhouse gas emissions that will contribute to climate change (Significant).

The proposed ARP would result in GHG emissions, primarily CO₂, emitted by trucks and earthmoving equipment associated with planned reclamation activities. Operation of diesel-powered equipment proposed to be used for reclamation activities (including five scrapers, four bulldozers, one front-end loader, one backhoe, a road grader, a water truck, and three light-duty trucks) over the 15 to 20 year phased reclamation period will result in considerable daily CO₂ emissions during each year's 8-10 week reclamation grading period. A small amount of GHGs would also be generated by employee vehicle trips (Table 4.2-12).

**TABLE 4.2-12
EMISSIONS OF GREENHOUSE GASES FROM PROPOSED RECLAMATION ACTIVITIES**

Emission Source	Emissions (tons eCO ₂ per year)			TOTAL
	CO ₂	CH ₄	N ₂ O	
Exhaust Emissions from On-Site Excavation and Transport Equipment	277	0.7	-	278
Worker vehicle trips (a)	10	0.0	0.4	10
Total Reclamation GHG Emissions	286	0.7	0.4	287
Project Lifecycle emissions (20 years)	5,720	13.7	8.4	5,742

SOURCE: ESA

Emission factors for CO₂ for on road vehicles are available from the Emissions Factors (EMFAC2007) program of the CARB, while emission factors for N₂O and CH₄ are available

from the California Climate Action Registry. Both CO₂ and CH₄ emission factors for reclamation truck and equipment may be calculated using the OFFROAD2007 model of the CARB, which shows no substantive emission of N₂O from these sources. Based on output from these models and emission data sources, GHG emissions from reclamation were estimated and are presented in Table 4.2-12 ~~4.2-11~~. GHG emissions of the ARP from proposed reclamation activities are estimated to be 286 tons per year of CO₂, 0.687 tons per year of methane as eCO₂ and 0.421 tons per year of nitrous oxide as eCO₂.² Over the lifecycle of the project (up to 20 years of reclamation activities), the total emissions of GHGs is estimated to be 5,742 tons of eCO₂. Because these emissions are from a source that did not exist in 1990, the impact is significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.2-3a: The applicant already uses a 20 percent biodiesel blend (B-20) in on-site mobile equipment; see Mitigation Measure R4.2-1a. The CO₂ produced by burning biodiesel is considered “biogenic,” that is, it is part of the natural cycling of carbon in the atmosphere and biosphere. Because it is not from a fossil source it is not included in GHG inventories.³ Therefore, the use of B-20 reduces CO₂ emissions that contribute to global climate change from on-site mobile equipment by approximately 20 percent.

Mitigation Measures Identified in This Report

Mitigation Measure R4.2-3b: Implementation of Mitigation Measure R4.2-1d, f, g, and h ~~through R4.2-3a~~ will reduce running time of diesel equipment, replace diesel equipment with less polluting equipment, and increase the use of biodiesel in on-site equipment. The amount of reduction in GHG emissions is estimated to be approximately an additional 65 percent.

Mitigation Measure R4.2-3c: Within one year of project approval, the applicant shall prepare and implement a GHG reduction plan. The plan will include a complete inventory of reclamation-related GHG emissions and will demonstrate how the Quarry will reduce or offset remaining un-mitigated GHG emissions. The plan will prioritize emission reduction through energy conservation and other measures; for those emissions that cannot be reduced, the plan shall specify how emissions will be offset. Offsets may take the form of installation of on-site alternative energy generation facilities (such as solar power) or off-site compensation, such as monetary contribution to a project that sequesters carbon. Examples of such projects include wetland restoration, purchase of carbon credits verified by the California Climate Action Registry, and reforestation. On-site offsets will be given higher priority than off-site offsets, and offsets with co-benefits, such as reduction of

² N₂O has a global warming potential 298 times that of CO₂ over a 100 year period; CH₄ has a global warming potential 25 times that of CO₂ (IPCC, 2007). The unit of measure “eCO₂” is an expression of the CO₂ equivalent global warming potential of the emission. Thus one ton of CH₄ is equivalent to 25 tons of eCO₂.

³ The California Air Resources Board currently is performing lifecycle analyses of biodiesel and other so-called “low-carbon fuels” as part of the AB32 regulatory process. Preliminary results indicate that biodiesel derived from soy beans grown conventionally (i.e., with synthetic pesticides and fertilizers) in the Midwest and used in California has a total “well to wheel” greenhouse gas emission rate about one third that of petroleum diesel: GHG emissions associated with biodiesel are calculated to be 35.26 grams of CO₂ equivalent per megajoule of energy content, versus 99.4 for California ultra-low sulfur diesel (CARB, 2008a, 2008b). Biodiesel derived from used vegetable oil can be expected to have substantially lower greenhouse gas emissions than soy-derived biodiesel, since about half of the GHG emissions associated with use of soy-derived biodiesel is from farming soy beans and extracting the oil from the beans (CARB, 2008b).

particulate emissions within the vicinity of the Quarry, and restoration of habitat for special status species, will be given higher priority. The plan must demonstrate how, at a minimum, the Quarry will reduce reclamation-related, non-biogenic GHG emissions consistent with the Marin County Greenhouse Gas Reduction Plan and Countywide Plan Update policies; since no reclamation-related emissions were occurring in 1990, the plan must demonstrate how reclamation-related emissions are reduced or offset, such that there are no net emissions from reclamation. The plan will include an implementation schedule. The plan will be submitted to the Marin County ~~Community Development Agency~~ Public Works Department for review and approval. In addition, the initial emissions inventory prepared as part of the plan will be reported to the California Climate Action Registry or a successor organization as a baseline inventory, and the Quarry will conduct and report additional inventories annually.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.2-3: In addition to Draft Mitigation Monitoring Measure R4.2-1, the Marin County Public Works Department ~~Community Development Agency (CDA)~~ and the BAAQMD will be responsible for reviewing and approving the GHG reduction plan, which must be submitted within one year of project approval. The Marin County Public Works Department ~~CDA~~ will also be responsible for monitoring implementation of the GHG reduction plan.

Level of Significance after Mitigation

Implementation of Mitigation Measures R4.2-3a, b, and c will together result in no net increase in GHG emissions related to reclamation activities, thus reducing the impact to less than significant.

Impact R4.2-4: The proposed Amended Reclamation Plan would result in post-reclamation development similar to that proposed in the 1982 Amended Reclamation Plan. These future land uses will result in emissions of criteria air pollutants (Less than Significant).

Post-reclamation land uses developed after completion of reclamation activities would consist of a mix of housing, commercial uses, community facilities (parks) and a marina. Each of these future land uses would result in air pollutant emissions, primarily from vehicle traffic generation, but also from space heating and landscape maintenance. While the density of post-reclamation development is currently unknown, future (year 2025) mobile and area source emissions associated with post-reclamation land uses consistent with the conceptual post-reclamation land use plan originally approved as part of ARP82 were calculated using the URBEMIS2007 model of the CARB and are presented in Table 4.2-13 (data sheets are located in Appendix C). Additional emissions would also be generated by pleasure craft berthed in the proposed Marina. Pleasure craft emissions would depend on the number and size of ships berthed and the frequency of daily operations, which are unknown at this time.

**TABLE 4.2-13
ESTIMATED POST-RECLAMATION OPERATIONAL EMISSIONS**

Pollutant	Emissions (pounds per day) ^a			Significance Thresholds
	Area Sources	Motor Vehicles	Total	
Carbon Monoxide (CO)	5.56	868	874	550
Reactive Organic Gases (ROG)	40.0	74.9	115	80
Nitrogen Oxides (NOx)	9.41	64.9	74.3	80
Particulate Matter (PM-10)	0.09	350	351	80
Carbon Dioxide (CO ₂)	16,900	195,100	212,000	NA
Methane (CH ₄)	33.0	676	709	NA
Nitrous Oxide (N ₂ O)	8.73	8,054	8,063	NA

^a Area source and motor vehicle emissions estimates were prepared using the URBEMIS2007 for Windows model. Wintertime and summertime temperatures used in the modeling effort were 40 and 85 degrees Fahrenheit, respectively. Wintertime emissions were calculated for CO only as recommended by BAAQMD guidance. Area source emissions for GHG's also include electricity generation for proposed land uses as calculated by the methodology of the California Climate Action Registry.

SOURCE: Environmental Science Associates, 2007.

While these emissions are projected to exceed BAAQMD significance thresholds for CO, ROG and PM-10, it should be noted that these emissions were already anticipated to occur under ARP82. Consequently, the proposed ARP04 would not result in a net increase in emissions from post-reclamation land use development over baseline conditions, and these emissions are

therefore not interpreted as a significant air quality impact of the proposed project. These emissions are considered later in this Section for their contribution to potential cumulative air quality impacts.

Mitigation: None required.

Impact R4.2-5: The proposed Amended Reclamation Plan would result in post-reclamation development and land uses that will emit greenhouse gasses, and contribute to global climate change (Significant).

Post-reclamation land uses, including residential, commercial, and marine developments and related energy consumption and transportation, will result in a new source of GHG emissions that did not exist in 1990. While the density of development is currently unknown, GHG emissions from development consistent with the conceptual development plan originally approved as part of ARP82 are shown in Table 4.2-13. Because GHG emissions from post-reclamation development would be new emissions that did not occur in 1990, they are considered significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in This Report

Mitigation Measure R4.2-5: The applicant shall revise the ARP to include a standard to guide the future design of the final Development Plan (due to be submitted to the County three years prior to the cessation of mining) to incorporate a detailed inventory of GHG emissions associated with the planned post-reclamation development, and a plan to reduce GHG emissions consistent with Countywide Plan policies and other relevant County, state and federal standards, as applicable.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.2-5: The Marin County Department of Public Works will review the revised ARP for completeness prior to project approval.

Level of Significance after Mitigation

Implementation of Mitigation Measure R4.2-5 will ensure that post-reclamation development and use of the site will be planned to reduce GHG emissions consistent with County, state, and federal policy, thus reducing the impact to less than significant.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.2-6: Future Quarry operations under the proposed Amended Surface Mining and Quarrying Permit could exceed baseline levels of production, with concomitant increases in emissions of criteria air pollutants above threshold values (Significant).

Current estimated emissions of criteria air pollutants from Quarry operations are presented in Table 4.2-5. The level of production of the Quarry in recent years is similar to or less than production in the years leading up to 1982, when the Quarry became a legal nonconforming use. Since pollutant emissions from most sources have likely decreased on a unit basis since 1982 because of improvements in diesel engine technology and improved management practices to reduce fugitive dust emissions, it can be assumed that, given the same level of production now as in 1982, emissions would be lower now. The emissions presented in Table 4.2-5 do not reflect emissions that would be generated by reclamation activities, which are considered under a separate impact statement.

For evaluating operational-phase emissions, the BAAQMD recommends that local agencies consider individual development projects that exceed a net increase in pollutant emissions of reactive organic gases (ROG), NO_x, or PM-10 exceeding 80 pounds per day or 15 tons per year to have a significant impact on the environment.

The proposed AQP, ~~however,~~ imposes no limits on the annual rate of production for the Quarry. Therefore, SRRQ could, during the remaining life of the Quarry, increase production over baseline (1982) levels. Increases in production would require increased use of stationary equipment and mobile on-site and off-site equipment, resulting in increases in emissions of criteria air pollutants. This analysis assumes that, in the absence of a limit on annual production levels, production could increase by up to 20 percent above baseline (i.e., 1982) levels. This is a conservative (i.e., worst case) assumption, because it is approximately equivalent to the highest single year production level reported by the Quarry, and is higher than any 5-year average since 1982. Projected emissions associated with increased production under the AQP are shown in Table 4.2-13.1. Different assumptions are used for different emissions sources, as explained in the table footnotes. For example, Since truck trips would be limited to 250 per day, while barge trips would not be limited, an increase in production could be expected to increase the number of daily barge shipments. of one The value of 897 pounds per day of NO_x from barge emissions shown in Table 4.2-5 for existing conditions is based on an assumption of two barge trips per day. One additional barge shipment per day would result in increased NO_x emissions of approximately 448 pounds per day, which itself would greatly exceed the BAAQMD significance threshold of 80 pounds per day. The AQP would also be expected to result in an increase of other criteria pollutants, but not above threshold values, as shown in Table 4.2-13.1 As shown on Table 4.2-5, on-site excavation, on-site transport and processing of materials currently generate an estimated 139 pounds per day of NO_x and 420 pounds per day of PM-10. This analysis assumes that, in the absence of a limit on annual production levels, production could increase by up to 20 percent above baseline (i.e., 1982) levels. This is a conservative (i.e., worst case) assumption, because it is approximately equivalent to the highest single year production level reported by the Quarry, and is higher than any 5-year average since 1982.

**TABLE 4.2-13.1 (NEW TABLE)
PROJECTED EMISSIONS OF CRITERIA AIR POLLUTANTS FROM
QUARRY OPERATIONS UNDER THE AQP**

Emission Source	Emissions (pounds per day)			
	CO	ROG	NO _x	PM-10
Permitted Stationary Sources ^a	2	1.6	7	297
Exhaust Emissions from On-Site Excavation and Transport Equipment ^b	63.6	14.4	158.4	6.1
Fugitive Dust Emissions from On-site Excavation and Transport Equipment (controlled) ^{b,c}				124.6
Blasting ^d				4
Off-Site Truck Emissions (trucks hauling materials to and from the project site) ^e	254	48.8	761	32
Barge (Tugboat) Emissions ^f	131.3	12.48	1,345.5	28.99
Total Projected Quarry Operational Emissions under the AQP	450.9	77.28	2,271.9	492.71
Existing Quarry Operational Emissions	410	72	1,797	464.4
Projected Increase: AQP above Existing	40.9	5.28	474.9	28.31
BAAQMD Significance Criteria	550	80	80	80

BOLDED values indicate significance threshold is exceeded.

- ^a Currently actual emissions are well below permitted levels; therefore, no increase in emissions is projected for stationary sources.
- ^b Assumed to increase 20 percent above current emissions, due to 20% increase in production.
- ^c Controlled emissions of PM-10 assume on-site watering to reduce fugitive emissions by 70 percent.
- ^d Daily emissions from blasting assumed not to increase (would remain at one blast per day maximum)
- ^e Assumes no increase in truck traffic.
- ^f Assumes 50 percent increase in barge emissions (based on one additional barge trip per day).

SOURCE: Table 4.2-5, ESA and KB Environmental

~~A 20 percent increase in the extraction and processing rate would increase PM-10 emissions by 84 pounds per day, which would also exceed BAAQMD significance threshold of 80 pounds per day for PM-10. Each blast at the Quarry is estimated to release about 4 pounds of PM-10 to the atmosphere. Since the Quarry does not set off more than one blast per day, increased production. Therefore, increased frequency of blasting is not expected to increase the daily emission of PM-10 related to blasting, exceed the BAAQMD significance threshold for PM-10, but more frequent blasting would be expected to increase the amount of dust experienced by neighbors of the Quarry.~~

Mitigation Measures Proposed as Part of the Project

Mitigation Measure P4.2-6a: Mitigation measures R4.2-1a, R4.2-1b, and R4.2-1c apply to equipment used in ongoing quarrying operations as well.

Mitigation Measures Identified in This Report

Mitigation Measure P4.2-6b: Implement Mitigation Measures R4.2-1d through R4.2-1h j for ongoing quarrying operations as well as reclamation activities.

Mitigation Measure P4.2-6c: Implement Mitigation Measure P4.6-6b (see Section 4.6, Land Use and Planning), which would limit Quarry operations to the maximum level of annual production as of 1982.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.2-6: The Marin County Department of Public Works (DPW) will be responsible for oversight and enforcement of these provisions. DPW will verify that a revised application for the AQP that contains the above provisions, including the Operational Dust Mitigation Plan/Program, and will approve said provisions prior to issuance of the AQP. After issuance of the AQP, DPW will conduct routine field inspection to verify implementation of these provisions. The Quarry must report its annual production to the County and to the State each year.

Level of Significance after Mitigation

The combination of Mitigation Measures P4.2-6a, b, and c would reduce this impact to less-than-significant. Mitigation Measure P4.6-6b, which limits production to 1982 levels of production, would prohibit SRRQ from increasing its daily emissions resulting from any increase in intensity of extraction and processing. Therefore, emissions from off-site transport via barge ~~and truck~~ would also remain at 1982 levels and thus result in no increase in daily emissions from ~~these~~ these sources. With adoption of these measures, the AQP would not result in an increase in daily pollutant emissions over existing or 1982 emission levels, and this impact would be mitigated to less than significant.

Impact P4.2-7: Proposed amendments to the Surface Mining and Quarrying Permit could result in an increase in greenhouse gas emissions, and contribute to global climate change (Significant).

GHG emissions within Marin County from existing SRRQ mining operations are estimated to be 39,238 tons per year of carbon dioxide (CO₂), 107 tons per year of methane (CH₄) as carbon dioxide equivalent (eCO₂) and 1,397 tons per year of nitrous oxide (N₂O) as eCO₂. Increases in GHG emissions associated with the proposed AQP would result from possible increases in production rates. The number of truck trips in and out of the Quarry would not change from baseline levels. However, increases in GHG emissions would result from any increase in production above baseline (1982) levels, which would be expected to result in increases in use of on-site mining equipment and barge shipments. Assuming that the AQP may result in a 20 percent increase in production above baseline levels, GHG emissions from on-site equipment would also increase by about 20 percent, and GHG emissions from tugboats would increase about 30 percent, as indicated in Table 4.2-14. Because the AQP could result in GHG emissions greater than 15 percent below 1990 levels, the impact is significant.

**TABLE 4.2-14
EXISTING AND PROPOSED COUNTYWIDE EMISSIONS OF
GREENHOUSE GASES FROM QUARRY OPERATIONS
(assuming 20 percent increase in level of extraction and
processing operations and 30 percent increase in barge transport)**

Emission Source	Emissions (tons eCO ₂ per year)		
	CO ₂	CH ₄	N ₂ O
Total Existing Quarry Operational GHG Emissions	39,238	107	1,397
<u>Increased</u> Exhaust Emissions from On-Site Excavation and Transport Equipment	457	1.100	1.79 2
<u>Increased</u> Generator <u>Emissions</u>	291	4.40	--
<u>Increased</u> Barge (Tugboat) Emissions	6,550	21.0	411
Total Increase in GHG Emission with AQP^b	7,298	26.54	413.1
Percent Increase over existing Emissions	18.6%	24.8 %	29.6 %

^a Assumes a 20 percent increase in level of extraction and processing operations and 30 percent increase in barge transport.

^b These GHG emissions represent those generated within Marin County, for comparative purposes to the County's 2006 Greenhouse Gas Reduction Plan. Off-site transportation by truck and barge also generates GHG emissions in other Counties, depending on destination of materials. Limiting impact analysis to in-county emissions understates the impact, in violation of CEQA. Should use total emissions.

SOURCE: ESA

Mitigation Measures Proposed as Part of the Project

Mitigation Measure P4.2-7a: The applicant proposes to limit truck trips into and out of the Quarry to 250 trips per day, which is below the baseline level of truck trips. Therefore, GHG emissions from haul trucks would not increase above 1990 levels.

Mitigation Measure P4.2-7b: The applicant already uses a 20 percent biodiesel blend in on-site mobile equipment; see Mitigation Measure R4.2-1a. Biodiesel reduces CO₂ emissions that contribute to global warming, since biodiesel is derived from plant and animal sources, not fossil sources.

Mitigation Measures Identified in This Report

Mitigation Measure P4.2-7c: Mitigation Measure P4.2-6b will further reduce GHG emissions below 1990 levels from on-site mobile equipment used for Quarry operations.

Mitigation Measure P4.2-7d: Mitigation Measure P4.6-6b will limit production to baseline (1982) levels, which will ensure no increase in emissions from on-site mobile diesel equipment and tugboats.

Mitigation Measure P4.2-7e: The Greenhouse Gas Reduction Plan specified in Mitigation Measure R4.2-3c2b shall also include an inventory of operations-related GHG emissions and a plan to reduce these emissions to a level 15 percent below 1990 levels. The plan will include an inventory of 1990 and current GHG emissions related to Quarry operations; the values in Table 4.2-14 may be considered preliminary, and should be confirmed or revised in a new inventory.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.2-7: See Draft Mitigation Monitoring Measures ~~R4.2-2~~ R4.2-1, R4.2-3, P4.2-6 and P4.6-6.

Level of Significance after Mitigation

The above mitigation measures will ensure that GHG emissions associated with quarrying operations do not exceed a level 15 percent below 1990 emissions; therefore, the impact will be mitigated to less than significant.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

The following analysis examines the potential for air quality impacts of the AQP and the ARP projects combined. Included here are the results of the Health Risk Assessment (HRA) conducted for the projects. Because of the cumulative nature of health risks from exposure to toxic air contaminants (TACs), the potential health risk impacts of the AQP and ARP are considered together; impacts of the individual projects are not considered separately. Within the impact discussion, however, information is presented on the relative contribution of sources associated with each of the two projects to the overall health risk.

Impact C4.2-8: Cumulative air quality impacts could result from quarrying activities implemented under the Amended Surface Mining and Quarrying Permit occurring simultaneously with proposed phased reclamation grading activities (Less than Significant).

Under ARP04, phased reclamation grading would occur simultaneously with ongoing quarrying activities; under the existing reclamation plan (ARP82), reclamation would occur after the cessation of mining. Simultaneous reclamation grading and mining activities could result in a cumulative air quality impact.

As stated under Impact P4.2-6, however, the Mitigation Measures specified for that impact would reduce criteria pollutant emissions associated with ongoing quarrying activities below the significance threshold; with these Mitigation Measures, emissions would be no greater than baseline. While emissions associated with reclamation grading cannot be reduced to less-than-significant, operational emissions would not contribute to the reclamation-related impact in a cumulatively considerable manner. Therefore, the cumulative impact would be less than significant.

Mitigation: None required.

Health Risk Assessment

An HRA was conducted to evaluate the cancer risks and non-cancer health effects associated with exposure to TACs emitted by ARP and AQP activities. Cancer risks are evaluated based on assumed lifetime exposure to TACs over the expected lifespan of the projects. Non-cancer health risks evaluated include adverse health effects from both acute (highest 1-hour exposure) and chronic (1-year exposure). The assessment methods are designed to estimate the highest possible,

or “upper bound” risks to the most sensitive members of the population (i.e., children, elderly, infirm), as well as those that are potentially exposed to TACs on a routine and prolonged basis (i.e., residents, recreational area users, and workers). The HRA was conducted in accordance with technical guidelines developed by federal and state agencies, including USEPA, California Office of Environmental Health Hazard Assessment (OEHHA),⁴ and the BAAQMD.⁵ The HRA is based on estimated emissions of a wide variety of TACs from the project site, and the length of time those living, working, and recreating in the vicinity of the Quarry could be exposed to TAC emissions. Actual exposures are not measured, but rather are modeled using sophisticated software that uses local meteorology and topography to predict the dispersion of TACs from their source, and the resulting concentrations at receptor sites. The models tend to be conservative, both in terms of the estimated exposure, and the toxic effects of the substances to which people are exposed: the models tend to overestimate the adverse health effect.

According to CalEPA guidelines, the results of an HRA should not be interpreted as the expected rates of cancer or other potential human health effects, but rather as estimates of potential risk or likelihood of adverse effects based on current knowledge, under a number of highly conservative assumptions and the best assessment tools presently available.⁶

The substances and sources included in the HRA are discussed below, and summarized in Table 4.2-15. Detailed information on the methodologies and assumptions used to perform the HRA, and a complete list of the substances and sources evaluated in the HRA, are contained in Appendix D.

Diesel Particulate Matter

Diesel exhaust is a complex mixture of thousands of individual gaseous and particulate compounds, including over 30 different toxic chemicals consisting mainly of solid particles and gaseous substances adsorbed onto the particle surfaces. Diesel Particulate Matter (DPM) is formed primarily through the incomplete combustion of diesel fuel, and is a component of the exhaust emitted by trucks, off-road mobile equipment, and stationary sources. The basic fractions of DPM are elemental carbon, heavy hydrocarbons derived from the fuel and lubricating oil, and hydrated sulfuric acid derived from sulfur contained in the fuel. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. DPM includes small nuclei mode particles of diameters below 0.04 microns (μm) and their agglomerates of diameters up to 1 μm .

Acute (that is, short-term) inhalation exposure to elevated concentrations of DPM has been shown to cause increased symptoms of irritation, cough, phlegm, chronic bronchitis, and inhibited pulmonary function. In August 1998, the California Air Resource Board (CARB) issued a health risk assessment for DPM, declaring it to be a carcinogen and identifying a cancer potency for the

⁴ Air Toxics Hot Spots Program Risk Assessment Guidelines, Parts I-IV and Appendices, California Environmental Protection Agency, OEHHA, 1997 - 2003.

⁵ BAAQMD Health Risk Screening Analysis Guidelines (http://www.baaqmd.gov/pmt/air_toxics/risk_procedures/hrsa_guidelines.pdf), June 2005.

⁶ California Environmental Protection Agency, OEHHA, Op Cit

substance. The CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* and *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* and approved these documents on September 28, 2000. The documents include proposals to reduce DPM emissions, with the goal of reducing emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed DPM filters and ultra-low-sulfur diesel fuel.

In December 2000, the USEPA, which also recognizes DPM as a carcinogen, promulgated regulations requiring that the sulfur content in motor vehicle diesel fuel be reduced to less than 15 parts per million (ppm) by June 1, 2006. Federal control of DPM emissions focuses on two strategies: reducing the amount of sulfur in diesel fuel and developing filters for operating diesel engines to reduce the amount of particulate matter that is emitted. The USEPA also finalized a comprehensive national emissions control program which regulates highway heavy-duty vehicles and diesel fuel as a single system. Finally, the EPA established new motor-related emission standards that will substantially reduce DPM from highway heavy-duty vehicles.

In 2001, CARB assessed the state-wide health risks from exposure to DPM and other TACs in diesel exhaust, and to other TACs. The study reported that in 2000, the state-wide cancer risk from exposure to diesel exhaust was about 540 per million population as compared to a total risk for exposure to all ambient air toxics of 760 per million: in other words, diesel exhaust is thought to account for about 70 percent of the total cancer risk from TACs in the state. This average is spread over both urban and rural areas in the state, but the estimate can be considered an average worst-case for the state, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where the majority of the population spend most of their time.

CARB also estimated health risks from DPM exposure in the Bay Area in year 2000 to be about 480 excess cancer cases per million population. (CARB, 2007). Again, this represents an average figure: those individuals who live, work, or recreate for extended periods within proximity to – and especially downwind of – major sources of diesel exhaust, such as freeways and other truck routes, ports, rail yards, rail lines, construction sites, shipping and receiving facilities, landfills, and some other industrial facilities, are exposed to DPM levels – and therefore cancer health risks -- substantially higher than those in areas more distant from major DPM sources. Still, nearly all people in the Bay Area and throughout California are exposed to levels of DPM emissions that substantially elevate the risk of developing cancer.

With increasingly stringent emissions standards imposed by the state and federal governments, DPM emissions are on a downward trend. Even before the CARB finding of DPM as a TAC in 1998, improvements in diesel engine technology had resulted in a substantial decline in the rate of DPM emissions (Figure 4.2-3). The reformulation of diesel fuel, the use of DPM filters in exhaust systems, and improvements to engine technology, along with the increased use of alternative fuels with lower particulate emissions (such as biodiesel, which can be substituted for conventional diesel, as well as compressed natural gas and liquid propane gas, which require a

switch to a different type of engine) will together result in substantial further reductions in the rate of DPM emissions from diesel equipment and vehicles, and, eventually, a likely downward trend in cancer risks related to TAC exposure. San Rafael Rock Quarry has already upgraded their on-site diesel equipment to the new, more stringent standards well ahead of the schedules required by state and federal regulations; the Quarry also currently uses a blend of 20 percent biodiesel in on-site equipment, further reducing DPM emissions.

DPM Emission Sources Included in the HRA

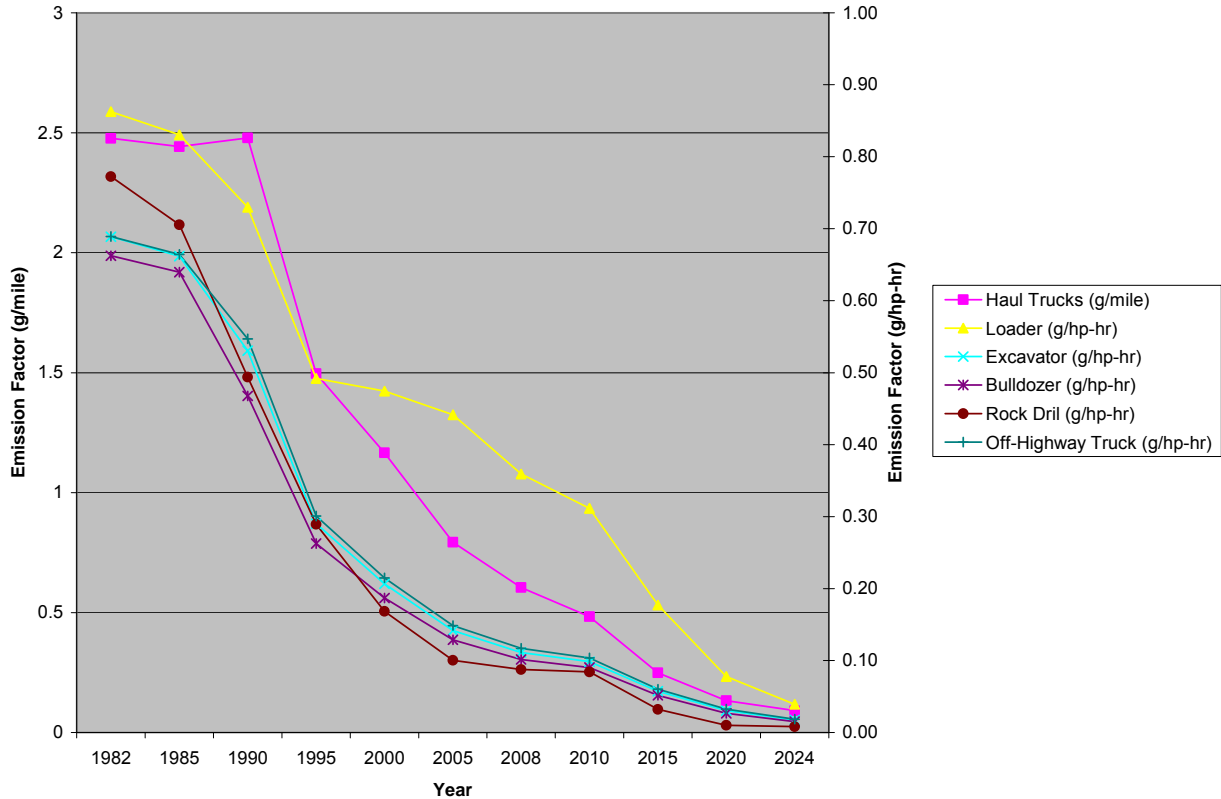
DPM emissions were assumed in the HRA to be generated by haul trucks and on-site mobile equipment through 2024, the expected lifetime of the Quarry under the proposed ARP. The number of daily haul trucks would remain at 250 per day, but on-site mobile equipment use was assumed to increase by 20 percent above the baseline (1982) level with a potential increase in aggregate production. The 20 percent figure is a conservative factor relative to the variation in production levels since 1982. The HRA also includes DPM emissions from equipment used in phased reclamation grading activities under the proposed ARP.

Haul truck emissions were estimated based on emission rate estimates from CARB's EMFAC2007 emissions model. Using this model, the total estimated DPM emissions from the project haul trucks is estimated to be 4.20 tons per year during 2008, decreasing to 0.63 tons per year by 2024, with the gradual replacement of older trucks with newer models that adhere to the stricter emissions standards (Figure 4.2-3). On-site mobile equipment emissions were estimated using CARB's OFFROAD2007 emissions model. Using this model, the total estimated DPM emissions from on-site sources is estimated to be 0.83 tons in 2007; decreasing to 0.12 tons by 2024; again, the decrease is due to the implementation of the tighter emission standards (Figure 4.2-3).

Barges propelled by diesel powered tugs would continue to be used to transport aggregate material. The total estimated DPM emissions from the project barges would be ~~4.23~~ 0.86 tons per year in each of the years from 2008 to 2024. Tug emissions were estimated based on USEPA *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data*, dated February 2000.⁷ Barge operations were assumed to increase as a function of the potential increase in aggregate production.

Detailed information concerning the emission factors and calculations for DPM emission sources is contained in Appendix D.

⁷ The HRA modeling conducted for the Draft EIR assumed use of conventional marine diesel (distillate) fuel in tug boats; just prior to publication of the Draft EIR, ESA received information from SRRQ that in fact low-sulfur red diesel #2 is used (Peer, 2008). This fuel type likely has a lower sulfur content than assumed in the model run. ~~The HRA results therefore reflect higher DPM and SOx emissions from tugs than actually occurs, adding another conservative element (i.e., over-prediction of health risks worst case assumption) to the exercise. Use of low-sulfur diesel fuel in the modeling would result in emissions estimates of 0.86 tons per year of DPM, vs. 1.23 tons per year with use of conventional marine diesel. These emission rates are reflected in the revised tables and text that follows.~~



San Rafael Rock Quarry ARP and AQP . 205145
SOURCE: California Air Resources Board OFFROAD2007 and EMFAC2007. **Figure 4.2-3**

Diesel Particulate Matter Emission Rate Factors Used in the Health Risk Assessment for On-Site Mobile Equipment and Haul Trucks, 1982 through 2024

Asphalt and Brickyard Emission Sources

The HRA modeled exposure to estimated TAC emissions from the asphalt plant on the Quarry site. Emission points within the asphalt plant include a natural-gas fired burner on the drying drum, the mixing drum, natural gas-fired hot oil heater in the asphalt oil storage tanks, other asphalt plant handling such as truck load-out and silo filling, and storage piles. The asphalt batching operations emit numerous TACs including hydrogen sulfide (H₂S), benzene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), and metals. Asphalt emissions were based on USEPA’s Compilation of Air Pollutant Emission Factors (AP-42), and an assumption that asphalt production would be about 20 percent higher than current levels. The total estimated H₂S emissions from asphalt batching would be 0.50 tons per year in each of the years from 2008 to 2024. The total estimated H₂S emissions from asphalt silo would be 0.49 tons per year in each of the years from 2008 to 2024.

While McNear’s Brickyard operations are not part of either the AQP or ARP, emissions from this facility were considered in the HRA to determine cumulative exposure effects. McNear’s

Brickyard includes crushing, grinding and screening operations, raw material handling and storage piles, brick drying and kiln firing. The brick manufacturing operations emit numerous TACs including hydrogen fluoride (HF), styrene, benzene, and metals. Brickyard emissions were based on USEPA's Compilation of Air Pollutant Emission Factors (AP-42) and the BAAQMD health risk study of the facility (BAAQMD, 2005c). The total estimated HF emissions from brickyard operations would be 5.50 tons per year each of the years from 2008 to 2024. Brickyard production levels were assumed to remain the same as current.

Detailed information concerning the emission factors and calculations for asphalt and brickyard operations is contained in Appendix D.

Fugitive Dust Emission Sources

Aggregate mining and processing operations, including blasting, produce fugitive dust emissions. Fugitive dust emissions are also produced as vehicles move over unpaved surfaces, and from wind erosion of exposed surfaces and stockpiles. Fugitive dust from the Quarry is assumed in the HRA to contain the same levels of potentially hazardous substances, notably crystalline silica and metals, as is found in the parent rock mined at the site (see Table 4.2-8a, b, and c, and the discussion of crystalline silica in the "Setting" section, above).

For the HRA, aggregate production levels were estimated to be 20 percent greater than current levels through 2024. Mining, materials handling, and processing emissions were all based on USEPA's Compilation of Air Pollutant Emission Factors (AP-42). The total estimated PM10 emissions from aggregate processing would be 4.7 tons per year each of the years from 2008 to 2024; from material handling the total would be 1.5 tons per year; and from blasting activities the total would be ~~0.09~~ 0.36⁸ tons per year. Fugitive dust emissions from vehicles traveling over unpaved surfaces were also based on USEPA's Compilation of Air Pollutant Emission Factors (AP-42). The total estimated PM10 emissions from unpaved areas would be 12.3 tons per year each of the years from 2008 to 2024.

Detailed information concerning the emission factors and calculations for fugitive dust emission sources are contained in Appendix D.

Exposure Assumptions

The exposure assumptions used to calculate health risks include exposure frequency, exposure time, exposure duration and averaging time. Each type of receptor considered in the HRA has its own unique set of exposure assumptions. For example, the HRA assumes a 70-year, 24-hour/day, 350 days/year exposure duration to calculate carcinogenic effects for residents. This exposure duration is equivalent to residents being present outdoors at their home seven days a week for 50 weeks/year (or about 96 percent of the time) with approximately 15 days spent away from home. Potential health impacts to an offsite worker will vary depending on the worker's schedule

⁸ The figure of 0.09 tons per year of fugitive dust from blasting was stated erroneously in the Draft EIR; the actual figure of 0.36 tons per year (727 pounds per year) was used as a basis for the Health Risk Assessment; therefore, the health risks of fugitive dust from blasting were not underestimated.

and the operating hours of the facility. Offsite workers are assumed to work eight hours/day, five days/week, 49 weeks/year, over a 40-year schedule. School children exposure assumptions were based on ~~eight~~ ten hours/day, five days/week, 180 days/year over ~~14~~ 9 years. School teacher exposure

assumptions were based on ~~eight~~ ten hours/day, five days/week, 180 days/year over 40 years. Individual body weights and breathing rates were based on OEHHA guidance. Of note, no off-site workers were included in the analysis, since using exposure duration factors for residential receptors is more conservative than the factors used for off-site workers.

For the cancer risk assessment, emission rates were determined based on the average emission rate over a 70-year lifetime (i.e., the project emission rate divided by 70 years). However, to model the chronic and acute health impacts, the maximum emission rate was used. In the case of DPM, maximum emission rates were assumed to occur in the beginning of the time period.

Interpretation of HRA Results

The HRA conducted for this EIR examines TAC emissions from the Quarry in isolation, not in combination with ambient levels found in the region, nor with other local sources of TACs, such as DPM emissions from diesel trucks on US 101. Therefore, the results of the HRA, as presented in the impact discussion below, are both more concentrated geographically and lower than the health risks actually experienced by people in the vicinity of the Quarry, since it can be assumed that all residents of the area are exposed to TAC emissions from a variety of sources other than the Quarry.

The numeric expression of the health risks presented below should be interpreted as the worst case (due to the conservatism built into the HRA) increment above background levels of cancer and non-cancer health risks attributable to emissions from the Quarry, not as the total health risk from TAC exposure experienced by people in the area. The cancer risk assessment should not be relied upon to predict the number of cancer cases that may actually occur in the area attributable to quarry emissions.

Impact C4.2-9: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including diesel particulate matter, increasing the risk of cancer for nearby sensitive receptors (Significant).

The results of the HRA were used to calculate increased risk of cancer from future TAC emissions associated with the proposed AQP and ARP combined, assuming project-related exposure would continue through 2024. Results of the HRA are summarized in Table 4.2-15.

For future Quarry operations and reclamation activities through 2024, the modeled receptor location with the highest exposure to TACs would have an incremental cancer risk at a rate of ~~14.2~~ 13.9 cancer cases per million exposed persons, which is above the significance threshold of 10 per million. A hypothetical person at this location is termed the “maximum exposed individual” (MEI). The term MEI refers to a person residing in the location of the highest concentration of TACs from the projects during the entire period included in the modeling exercise. The MEI for future exposure is located to the north of the Quarry (Figure 4.2-4). Figure 4.2-4 indicates that a slightly elevated risk of cancer due to future emissions of the AQP and ARP will be experienced

**TABLE 4.2-15
HEALTH RISK ASSESSMENT RESULTS MAXIMUM EXPOSED INDIVIDUAL,
FUTURE EMISSIONS FROM THE AQP AND ARP COMBINED**

Condition/Years	Cancer Risk ^a	Chronic Impact ^b	Acute Impact ^b
Proposed Projects (assumes 20 percent increase in production over baseline for the AQP) (2008 – 2024)	44.2 13.9	0.61	1.0
Project with Mitigation Measure C4.2-9a (<u>use of B80 fuel in on-site mobile equipment</u>) (limit production to 1982 levels)	40.3 10.0	0.59	1.0
Project with Mitigation Measure C4.2-9b (<u>limit production to 1982 levels</u>) (use of B80 fuel in on-site mobile equipment)	40.6 10.3	0.60	1.0
Project with both Mitigation Measure C4.2-9a and C4.2-9b incorporated	7.7 7.4	0.59	1.0
Maximum Exposed Individual: Type ^c	Residential	Residential	Recreational

Notes:

Values exceeding significance thresholds are **BOLDED**.

^a Risk of additional cancer cases per million exposed individuals. The significance threshold is 10.

^b Chronic and acute impacts are measured using the Hazard Index, where the significance threshold is >1.

^c Type of receptor exposed to the maximum modeled concentration of TACs

SOURCE: ESA

by individuals along Point San Pedro Road and in the Peacock Gap neighborhood. However, the level of exposure does not result in a significant cancer health risk, except for a limited area around the Marin Bay Park development. Please note that, as previously discussed, the HRA examined only health risks associated with emissions from the Quarry, and did not include the health risks associated with regional or other local TAC emission sources.

As shown in Table 4.2-16, over 99 percent of the cancer risk at the location of the MEI as a result of the proposed projects is due to DPM emissions, and ~~87~~ **89** percent is due to DPM from onsite mobile equipment operations associated with Quarry operations, not reclamation. Most of the exposure along Point San Pedro Road is from haul trucks.

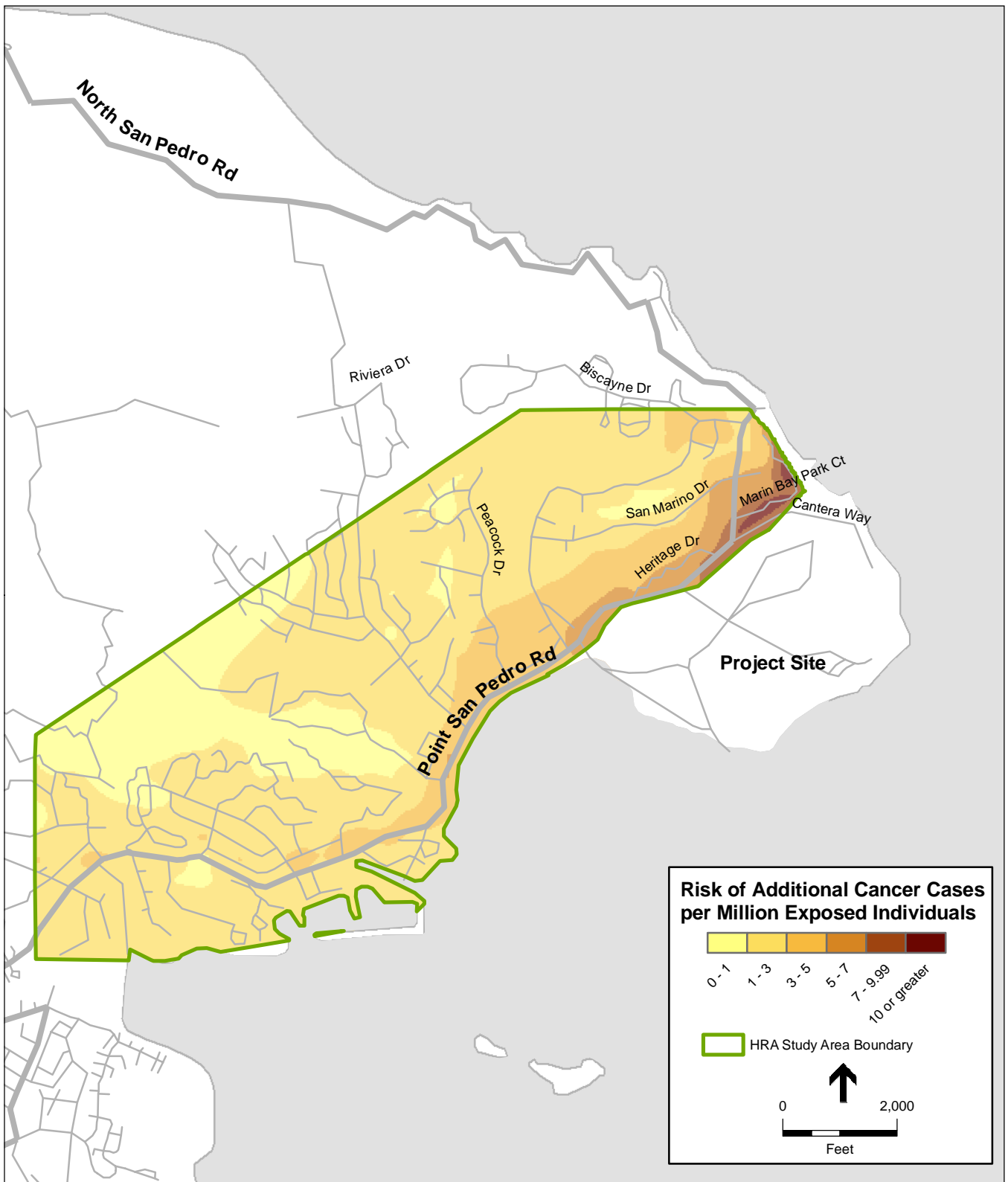
Because the combined projects would increase the incremental risk of cancer at the location of the MEI by more than 10 per million exposed individuals, the impact is significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure C4.2-9a: As noted in Mitigation Measures R4.2-1 and P4.2-6, the applicant has taken measures to reduce DPM emissions from on-site equipment, including upgrading to lower emission engines and use of B-20 fuel.

Mitigation Measures Identified in This Report

Mitigation Measure C4.2-9b: Implement Mitigation Measure P4.6-6b, which would limit proposed project aggregate production levels to 1982.



SOURCE: ESRI, 2007; ESA, 2007; STI, 2005

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Figure 4.2-4
Incremental Cancer Risk: Toxic Air Contaminant Emissions of the Combined Projects

**TABLE 4.2-16
CANCER RISK SOURCE CONTRIBUTIONS TO THE
RISK OF INCREASED CANCER CASES PER 1,000,000 EXPOSED INDIVIDUALS AT THE LOCATION
OF THE MAXIMUM EXPOSED INDIVIDUAL**

Source	Incremental Cancer Risk per Million Exposed Individuals	Percent of Risk
DPM from Onsite Mobile Equipment (AQP operations)	12.4	87% 89%
DPM from Reclamation activities	0.5	4%
DPM from Haul Trucks	0.3	2%
DPM from Tugs	0.9 0.6	6% 4%
All DPM Sources	14.4 13.8	99%
All Other Sources	0.1	1%
All Sources	14.2 13.9	100%

NOTE: Values exceeding significance thresholds are BOLDED.

SOURCE: ESA

Mitigation Measure C4.2-9c: Implement Mitigation Measure R4.2-1 and Mitigation Measure P4.2-6 to further reduce DPM emissions from on-site mobile equipment used both for reclamation and for mining operations.

Mitigation Monitoring and Reporting

See Draft Mitigation Monitoring Measures R4.2-1, P4.2-6, and P4.6-6.

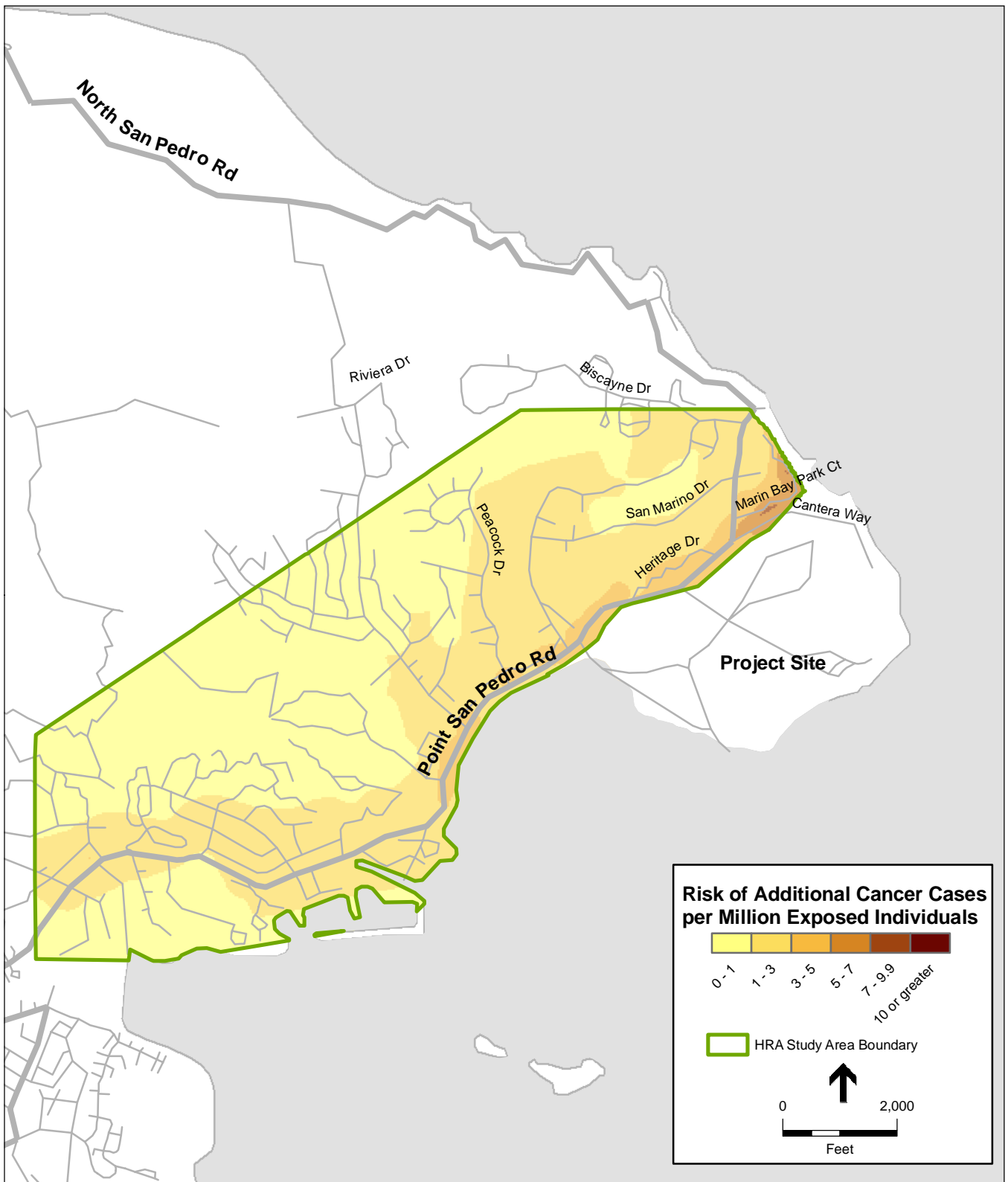
Level of Significance after Mitigation

As shown in Table 4.2-15 and illustrated in Figure 4.2-5, incorporation of Mitigation Measures C4.2-9a, b, and c would reduce the incremental increased cancer risk to ~~7.7~~ **7.4** cases per million exposed persons at the site of the MEI, which is below the threshold value of 10. Therefore, the impact would be mitigated to less than significant.

Impact C4.2-10: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including crystalline silica, that would increase chronic health impacts (Less than Significant).

The HRA was used to determine the chronic health impacts associated with TAC emissions from both Quarry operations under the AQP and reclamation under the ARP. Chronic health impacts are measured using the “Hazard Index” (HI) rating where values greater than one are considered

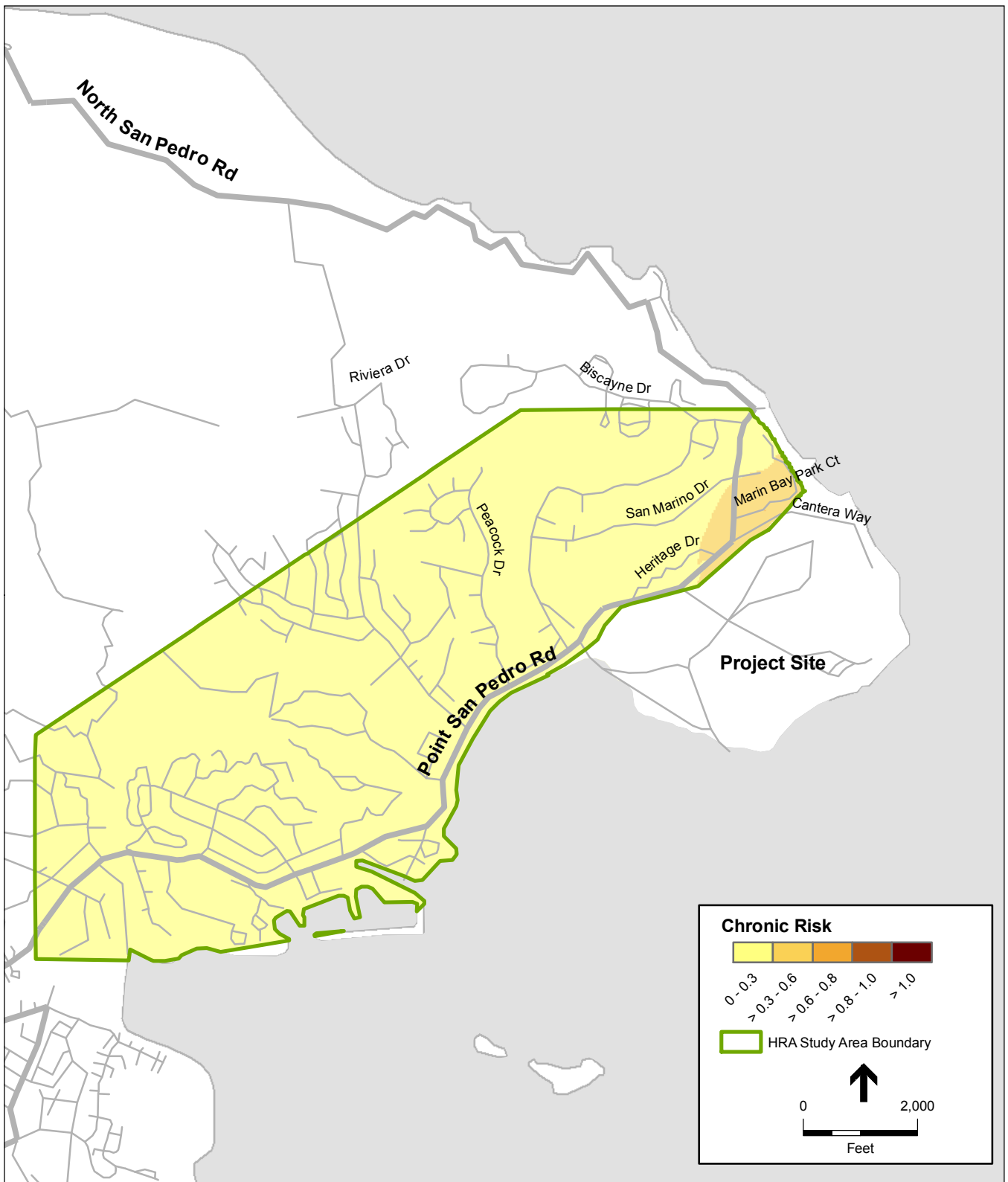
significant. The results of the HRA are shown in Table 4.2-15, which indicates that emissions from the proposed projects would result in chronic exposure at the location of the MEI with an HI of 0.61. This value is below the threshold value of greater than 1. The approximate distribution of HI ratings for chronic health impacts due to the proposed projects is shown in Figure 4.2-6.



SOURCE: ESRI, 2007; ESA, 2007; STI, 2005

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Figure 4.2-5
Incremental Cancer Risk: With Mitigation Measures Incorporated



SOURCE: ESRI, 2007; ESA, 2007; STI, 2005

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Figure 4.2-6
Incremental Chronic Risk: Toxic Air Contaminant Emissions of the Combined Projects

Table 4.2-17 shows that the majority of the chronic health risk from the projects at the location of the MEI will be due to exposure to crystalline silica emissions: 92 percent of chronic health impacts would be from crystalline silica exposure, and 70 percent from crystalline silica originating from vehicles traveling over unpaved surfaces.

**TABLE 4.2-17
SOURCES AND SUBSTANCES, AQP AND ARP EMISSIONS CONTRIBUTING TO CHRONIC HEALTH RISK AT LOCATION OF THE MAXIMUM EXPOSED INDIVIDUAL FOR THE PROPOSED PROJECT**

Source	Hazard Index Rating	Percent of Risk
Crystalline Silica from Blasting	0.02	3%
Crystalline Silica from Aggregate Processing	0.04	7%
Crystalline Silica from Other Fugitive Dust	0.06	10%
Crystalline Silica from Reclamation Activities	0.02	3%
Crystalline Silica from Unpaved Roads	0.43	70%
All Crystalline Silica Sources	0.56	92%
All Other TACs	0.05	8%
All Sources	0.61	100%

NOTES:
Significance threshold is 1.0.
Not all numbers add properly due to rounding.

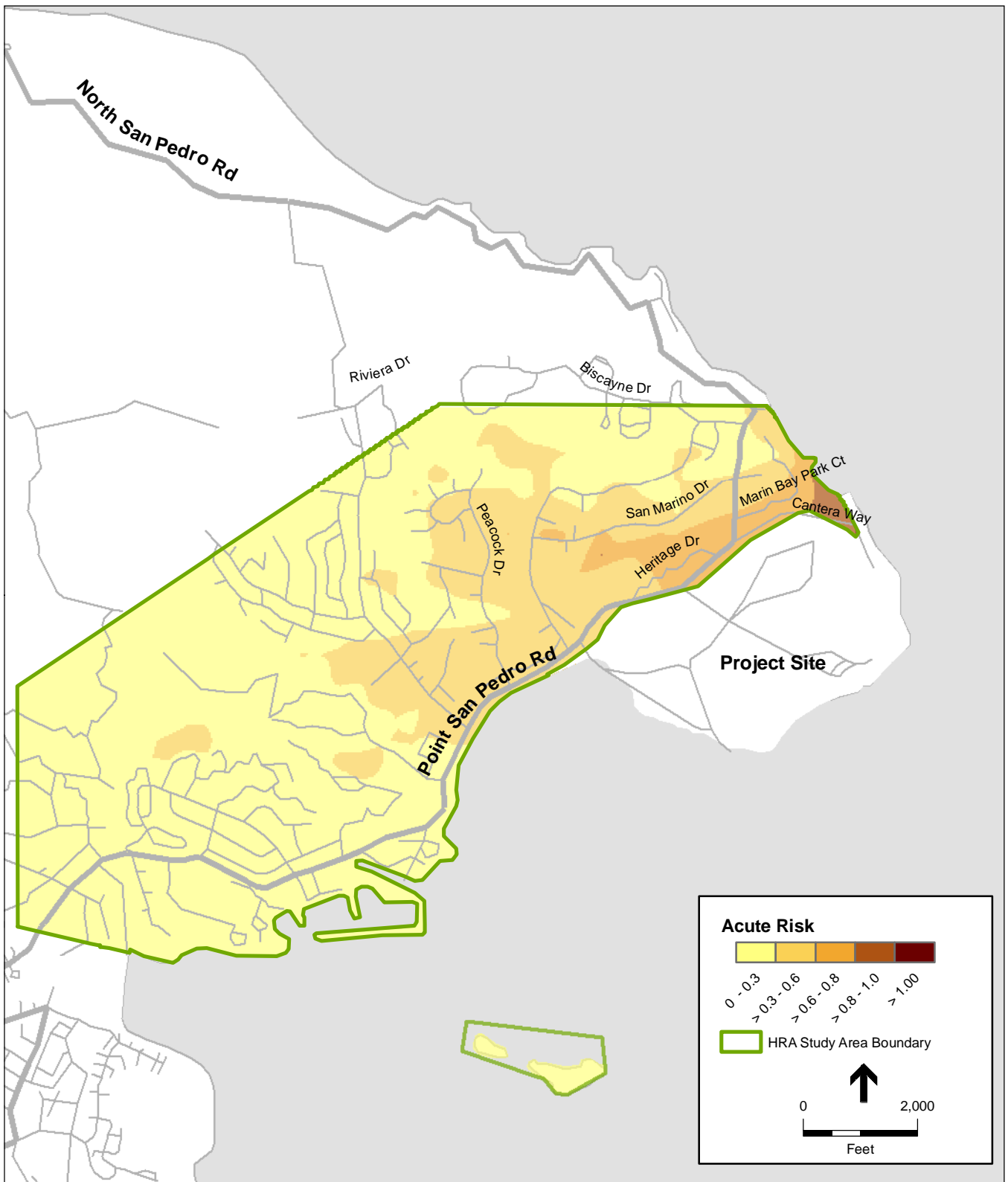
SOURCE: ESA

Because the highest level of chronic health risk from the projects would be less than the significance threshold of greater than one, the impact is less than significant.

Mitigation: None required.

Impact C4.2-11: Toxic Air Contaminant emissions could cause an acute health impact for nearby receptors (Less than Significant).

The HRA considered potential acute health effects, which are determined by estimating the maximum 1-hour exposure to TACs. The HRA found that the majority of the acute health risk posed by emissions from the Quarry (including ARP, AQP, and brickyard-related emissions) is from hydrogen sulfide (H₂S) emitted by the Quarry’s asphalt plant. Like chronic risks, acute risks are measured using the “Hazard Index,” where ratings of greater than one are considered significant. As shown in Table 4.2-15, both past and future acute health effects of TAC emissions from the Quarry were found to have an HI rating of 1.0 at the MEI (calculated to the next decimal, the rating is 1.01, which is rounded to 1.0). The approximate distribution of HI ratings for acute health risks in the vicinity of the Quarry is shown in Figure 4.2-7.



SOURCE: ESRI, 2007; ESA, 2007; STI, 2005

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Figure 4.2-7
Incremental Acute Risk: Toxic Air Contaminant Emissions of the Combined Projects

H₂S has a highly distinctive, highly disagreeable odor (“rotten egg” smell) at very low concentrations, below the level at which a significant acute health risk would occur. The Marin County Public Works Department reports no such odor complaints in the vicinity of the Quarry, indicating that actual H₂S emission rates from the asphalt plant are likely much lower than those used in the HRA (the HRA estimated emissions based on USEPA’s Compilation of Air Pollutant Emission Factors (AP-42), which assumes a certain sulfur content in the produced asphalt). Because the HRA found an HI rating of 1.0, and because there is no record of complaints to suggest that H₂S emissions are detected by neighbors of the Quarry, suggesting that sulfur content in the produced asphalt is lower than USEPA assumption, the impact is considered less than significant.

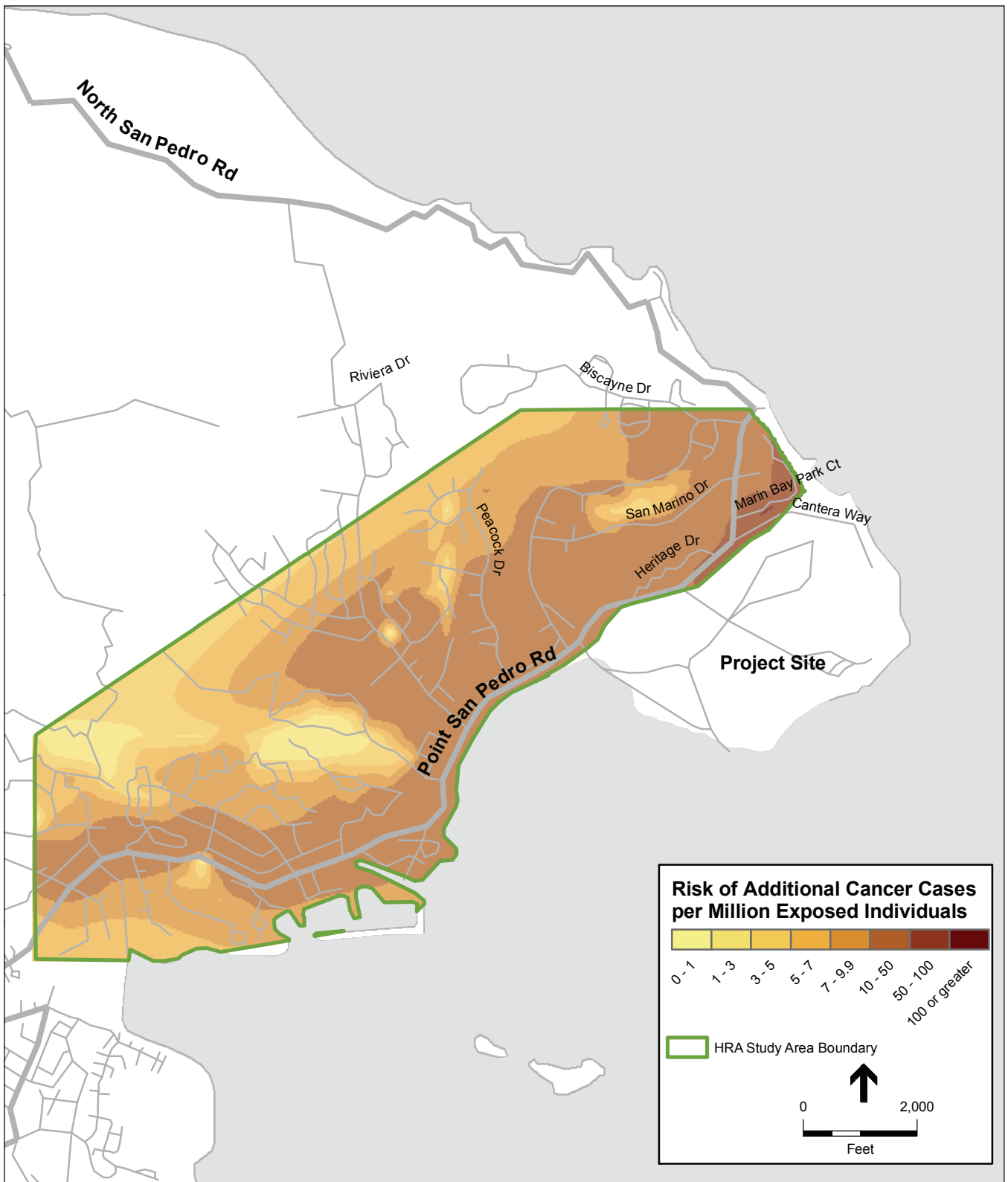
Mitigation: None required.

Impact C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the Amended Surface Mining and Quarrying Permit (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan, and post-reclamation land uses could cause significant cumulative health effects (Significant).

The HRA modeled past exposure to TACs from past Quarry operations from 1982, when ARP82 was approved, through 2007. Emissions were estimated based on known or estimated rates of production and shipment of quarry products, and on published emission factors for the period modeled. The same receptor locations and types used for the modeling of future (AQP and ARP-related) emissions were used for past emissions, though it should be noted that several residences, including those on Heritage Drive and Marin Bay Park Court, were not built until the late 1980s or early 1990s. As with the modeling of future emissions, the modeling of past emissions examined only quarry-related emissions in isolation from regional and other local sources.

As shown in Figure 4.2-8, cancer risks from past operations (1982-2007) were well in excess of the significance threshold of 10 cancer cases per million exposed individuals over a broad area of the neighborhoods around SRRQ. The highest incremental increase in cancer risk (at the MEI, located to the northeast of the Quarry), was 109 cancer cases per million exposed population. Since the area where the MEI is located, that is, in the Marin Bay Park development, was not developed until the late 1980s or early 1990s, no individuals would actually have been exposed to this high a risk. Somewhat lower rates, still in excess of the 10 in a million threshold, were calculated for receptor locations along Point San Pedro Road and throughout the Peacock Gap neighborhood; note in Figure 4.2-8 the area within the 10-50 category. Emissions from quarry operations prior to 1982 were not estimated, nor their health risk effects modeled, but these earlier emissions would have added to the cancer risk depicted in the figure. The higher rate of cancer risk from past emissions (relative to future risk) is due to the higher rates of DPM emissions from diesel trucks and on-site mobile equipment in the past: as indicated in Figure 4.2-3, a greater portion of the emissions (and therefore the contribution to cancer health

risks) occurred earlier in the period modeled, and both the rate of emissions and their contribution to cancer health risks declined over the period modeled. It should be noted that this decline in the emission rates of diesel equipment, and therefore the cancer health effects of exposure, likely mirrored a similar trend throughout the Bay Area region and the entire state (and nation). Thus, it



SOURCE: ESRI, 2007; ESA, 2007; STI, 2005

Note: Not all areas within study boundaries were developed at the beginning of the exposure period. This includes Marin Bay Park Court and Heritage Drive.

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Figure 4.2-8
Incremental Cancer Risk from
Past Operations 1982-2007

can be assumed that exposure levels and cancer health effects in past years from other sources (non-quarry operations) were also much higher than present levels.

Impact C4.2-9 describes the incremental increase in cancer risk associated with future emissions from the proposed ARP and AQP. As stated in that impact discussion, without mitigation the rate of incremental increase is estimated to be ~~14.2~~ 13.9 additional cancer cases per million exposed individuals at the site of the MEI; with mitigation (Mitigation Measures C4.2-9a, b, and c) the rate declines to ~~7.7~~ 7.4. While this latter figure is below the significance threshold for the future projects, the addition of the risk values for future exposure to the levels calculated for past exposure would result in an increase in the cancer risk in areas already exposed to a rate of over ten additional cancer cases per million exposed population, as well as an increase in the area with this level of exposure. at the site of the MEI for the exposure period 1982-2024. Even with mitigation, therefore, the AQP and ARP projects would make a considerable contribution to a significant cancer health risk that is to cumulatively considerable, significant cancer health risk. Furthermore, while the ARP currently under consideration would provide sufficient resource for mining through approximately 2024, SRRQ could in the future again seek to amend its reclamation plan to allow for additional mining. It is reasonably foreseeable that the level of operations would be similar to those currently proposed, and that they would result in additional cancer health risk; however, since the rate of DPM emissions will continue to decline (see Figure 4.2-3), the additional cancer risk associated with any future operations beyond that envisioned in the currently proposed ARP would likely be quite small. Taken together, past, current, and reasonably foreseeable future cumulative cancer risks are considered significant. Post-reclamation land-uses are anticipated to include residential, commercial, and open space, as well as the development of a marina. None of these uses and associated transportation are likely to result in emissions of toxic air contaminants in quantities that would cause substantial cancer or non-cancer health risks. However, the possibility of future use of the site for a ferry landing could result in continued exposure of neighbors of the site, as well as future residents of the site, to emissions from marine equipment. While it would be speculative to estimate the level of emissions from future ferry operations, they may be expected to be similar to tugboat emissions associated with Quarry operations.

~~As part of the HRA, past chronic and acute non-cancer health risks were also modeled, based on information and assumptions regarding past operations for the period 1982-2007. Results were similar to those reached for future chronic and acute effects, as discussed in Impacts C4.2-10 and C4.2-11: the highest acute HI value was also 1.0, and the highest chronic HI value was 0.77 (compared to 0.61 for the future projects). The somewhat higher value for past chronic exposure, relative to future exposure, is due to an assumption of increased effectiveness of future dust control measures under the AQP.~~

As previously discussed, acute risks are calculated based on the highest 1-hour exposure; exposures below the significance threshold do not combine in a cumulative manner. Chronic effects are based on the highest 1-year exposure. Exposures resulting in an HI below the significance threshold are considered not to cause chronic health risks; therefore, the level of past exposure to quarry emissions does not add to future exposure in a cumulative manner. For both acute and chronic health risks, the cumulative impact is less than significant.

Mitigation: No additional mitigation is available to further reduce the cancer health risks from the current projects or from reasonably foreseeable future projects, beyond those stated in Mitigation Measures C4.2-9a, b, and c. This cumulative impact is therefore considered significant and unavoidable.

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4.3 Biological Resources

Introduction

This chapter identifies the existing biological resources at the San Rafael Rock Quarry (SRRQ) and surrounding areas, identifies the federal, state, and local regulations pertaining to biological resources within the region, and describes the impacts of both projects on those biological resources as well as mitigation measures to reduce potentially significant impacts. Information used in the preparation of this section was obtained from regional biological studies, existing biological reports on the project site (LSA, 2004), reports from the California Natural Diversity Database (CNNDDB, 2006), California Native Plant Society Electronic Inventory (CNPS, 2006), and U.S. Fish and Wildlife (USFWS, 2006), reconnaissance-level field surveys, and standard biological literature.

Vegetation types and wildlife habitats were identified using both records and field observations. Environmental Science Associates (ESA) staff biologists conducted reconnaissance-level field surveys of the project site on July 17 and August 6, 2006 to gather information and verify existing data on vegetative communities, wildlife habitats, and habitat use on and surrounding the site.

Setting

Regional Setting

The SRRQ regional setting was described in detail in Chapter 3, Project Description. SRRQ is located in the Bay Area-Delta Bioregion (as defined by the State's Natural Communities Conservation Program). This Bioregion is comprised of a variety of natural communities, which range from salt marshes to chaparral to oak woodlands. The high diversity of vegetation and wildlife found in Marin County, which reflects that of the region as a whole, is a result of topographic and micro-climate diversity that promote relatively high levels of endemism.¹ This has, in combination with the rapid pace of development in the region, resulted in a relatively high degree of endangerment for local flora and fauna.

Project Site

Vegetation and the wildlife habitat it affords has been highly disturbed throughout most of the SRRQ. Originally vegetation at this site would have been a mosaic of tidal marshes, native grasslands, coastal scrub, and oak woodlands. Today, remnants of these habitat types still exist in portions of the site and six terrestrial habitat types and five wetland types can be found at the SRRQ. All of the wetland types are considered to be sensitive communities. Sensitive communities include those that are especially diverse, regionally uncommon, considered sensitive natural communities by California Department of Fish and Game (CDFG), or are otherwise covered by state, federal, or local regulations. In addition the project area encompasses the open water/estuarine aquatic communities comprised of San Pablo Bay, San Pablo Straits, and San Rafael Bay. See Figure 4.3-1 for an overview of habitat types within the project area.

¹ *Endemism* refers to the degree to which the distribution of organisms or taxa are restricted to a geographical region or locality and are thus individually characterized as endemic to that area.

Vegetation Communities and Wildlife Habitats

Terrestrial Habitat

Barren/Ruderal

Barren/Ruderal (disturbed and weedy) habitat comprises the highest proportion of habitat found throughout the SRRQ. This habitat type covers the entire SE Quadrant of the SRRQ and also covers large portions of the northeast and northwest quadrants. In all of these highly disturbed areas barren areas occur in a mosaic interspersed with patches of ruderal vegetation. The active Quarry site is primarily barren rock but, even here, ruderal vegetation occurs on small benches and terraces. Where vegetated, these sites are dominated by opportunistic, weedy, non-native plant species, including a variety of non-native grasses such as ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), and wild oats (*Avena* sp.), as well as herbaceous weeds such as black mustard (*Brassica nigra*), yellow star thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), pampas grass (*Cordateria jubata*), and bristly ox-tongue (*Picris echioides*).

Ruderal habitats may provide limited foraging or nesting habitat for disturbance tolerant birds and small mammals (e.g., English sparrow (*Passer domesticus*), European starling (*Sternus vulgaris*), house finch (*Carpodacus mexicanus*), Norway rat (*Rattus norvegicus*), and house mouse (*Mus musculus*)). Within the SRRQ, less recently disturbed ruderal areas may be occupied by California ground squirrels (*Spermophilus beechyi*) and pocket gophers (*Thomomys bottae*). Although these areas generally lack suitable habitat for native wildlife, under appropriate conditions they may support sensitive wildlife species.

Developed areas within the SRRQ are not mapped separately from this habitat type (Figure 4.3-1) and are primarily covered by buildings and pavement, but also include a few landscaped areas and turfgrass. These include McNear's Brickyard, several on-site residences, and the area surrounding the Quarry office buildings. These areas provide limited wildlife habitat and generally support only generalist,² and sometimes non-native wildlife species that are tolerant of human presence and activities, such as English sparrow or opossum (*Didelphis virginiana*).

Non-native grassland

Non-native grasslands occur in the northeastern quadrant of the SRRQ. Similar to the ruderal habitat described above these grasslands are composed of non-native grasses, including rattail fescue (*Vulpia myuros*), wild oats, ripgut brome, Italian ryegrass (*Lolium multiflorum*), and soft chess. The difference between the two habitat types is primarily a matter of vegetative cover—in non-native grasslands, grasses make up approximately 60 to 70 percent of the cover and vegetative cover overall is relatively dense. Where ruderal areas are vegetated by grasses the cover is generally far more sparse. Other plant species that can be found in the non-native grasslands on-site are California poppy (*Eschscholzia californica*), filaree (*Erodium cicutarium*), lupine (*Lupinus* sp.), prickly lettuce (*Lactuca serriola*), and yellow star thistle.

² Generalist species are able to use a variety of habitats and food sources, unlike many special-status species that are closely restricted to a specific habitat type or food source.



SOURCE: ESA

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Figure 4.3-1
Habitat Types

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Non-native annual grasslands, as well as the mixed perennial grasslands described below, can provide refuge for reptiles such as western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinata*), and gopher snake (*Pituophis ~~catanifer melanoleucus~~*) as well as grassland birds such as mourning dove (*Zenaida macroura*). Grasslands also serve as important foraging grounds for aerial and ground-foraging insect eaters such as *Myotis* bat species. Mammals such as Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), and western harvest mouse (*Reithrodontomys megalotis*), commonly forage within urban and disturbed grasslands. These small rodents may attract raptors, including red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and white-tailed kite (*Elanus leucurus*).

Mixed perennial grassland

Mixed perennial grassland occurs at SRRQ in the southwestern quadrant on South Hill and on a smaller ridge to the west of South Hill and south of the brick yard. On South Hill these grasslands occur in small patches that are found in woodland canopy openings. Purple needlegrass (*Nassella pulchra*) is one of the dominant species and a number of other native perennial grasses are co-dominants, including blue wildrye (*Elymus glaucus*), creeping wildrye (*Leymus triticoides*), foothill needlegrass (*N. lepida*), California melic (*Melica californica*), fescue (*Festuca* sp.). Herbaceous species noted in these grasslands included mule's ears (*Wyethia* sp.), California poppy, and lupine.

Coastal scrub

Coastal scrub is a highly variable plant community. At SRRQ this community is primarily dominated by California sagebrush and occurs primarily on thin soils and rock outcrops on south and east facing slopes and coastal bluffs. The dominant shrub is California sagebrush (*Artemisia californica*), with sticky monkeyflower (*Mimulus aurantiacus*) and coyote brush (*Baccharis pilularis*) sometimes occurring as sub-dominants. The understory can include mugwort (*Artemisia douglasiana*), dudleya (*Dudleya* sp.) and indian paintbrush (*Castilleja affinis* ssp. *affinis*), with native perennial grasses, such as foothill needlegrass, and ferns, including goldback fern (~~*Pityrogramma*~~ *Pentagramma triangularis*) occurring in openings in the overstory.

Coastal scrub provides nesting and foraging habitat for various birds, including spotted towhee (*Pipilo maculatus*) and California towhee (*Pipilo crissalis*), ~~common~~ bushtit (*Psaltriparus minimus*), western scrub jay (*Aphelocoma coerulescens*), and California quail (*Callipepla californica*). Raptors may forage over such areas and prey upon some of these small birds, as well as small mammals and reptiles such as California ground squirrel, brush rabbit (*Sylvilagus bachmani*), and western fence lizard.

Coast live oak woodland

Coast live oak woodland at SRRQ is found on the south and western facing slopes of South Hill. This woodland ranges from dense to relatively open canopy and associate overstory species include madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), and toyon (*Heteromeles arbutifolia*). The understory includes poison oak (*Toxicodendron diversilobum*), Scotch broom (*Cytisus scoparius*), coyote brush, and an assortment of grasses, including hedgehog dogtail (*Cynosurus echinatus*), large quaking-grass (*Briza maxima*) and purple needlegrass. Where the canopy is relatively open herbaceous species such as snakeroot (*Sanicula*

crassicaulis), suncups (*Camissonia ovata*), and hedge nettle (*Stachys ajugoides*) can be found (LSA, 2004).

In general, oak woodland communities in the area can support an abundant assortment of common reptiles, amphibians, and small mammals such as western skink (*Eumeces skiltonianus*), Pacific chorus frog (*Pseudacris ~~Hyla~~ regilla*), ~~southern~~^{northern} alligator lizard (*Elegania ~~coerulea~~*), gopher snake (*Pituophis melanoleucus*), California Pacific slender salamander (*Batrachoseps attenuatus*), and dusky-footed woodrat (*Neotoma fuscipes*). Resident and migratory bird species found in oak woodlands include spotted towhee, brown creeper (*Certhia americana*), oak titmouse (*Baeolophus ~~Parus~~ inornatus*), Hutton's vireo (*Vireo huttoni*), western scrub jay, northern flicker (*Colaptes auratus*), dark-eyed junco (*Junco hyemalis*), downy woodpecker (*Picoides pubescens*), and orange-crowned warbler (*Vermivora celata*). These areas may also provide important roosting habitat for Myotis bat species, which can roost in hollow trees and crevices in bark. Raptors that breed and nest in local woodland communities include red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), white-tailed kite, and others. The woodlands at SRRQ are known to support wild turkey (*Meleagris gallopavo*) and California mule deer (*Odocoileus hemionus californicus*).

Eucalyptus woodland

Non-native eucalyptus stands can be found on South Hill as well as along the road to McNear's Beach County Park and the property boundary between the park and SRRQ. Mature blue gum eucalyptus (*Eucalyptus globulus*) is generally the only species in the overstory canopy. Beginning in the late 1800s this species was widely planted throughout California for lumber, shade, or as a windbreak. Understory vegetation ranges from sparse and consisting primarily of non-native weedy species to, where the canopy is more open, coyote brush, sticky monkey flower, and patches of native perennial grasses mixed with non-native annual grasses. Mature eucalyptus groves provide nesting habitat for a number of raptors, including red-tailed hawks, red-shouldered hawks (*Buteo lineatus*), and great horned owls (*Bubo virginianus*). Eucalyptus may also provide roosting and nursery sites for several bat species, including fringed myotis (*Myotis thysanodes*) and long eared myotis (*Myotis evotis*), as well as Monarch butterflies (*Danaus plexippus*).

Freshwater Wetland and Open Water Habitat

Freshwater seep

There is a freshwater seep located along a dirt road in the NE Quadrant of SRRQ. This seep begins as a large patch of tules (*Scirpus* sp.) on a slope above the road and continues as a narrow band along the roadside for approximately 150-200 feet. Other seep plant species present include iris-leaved rush (*Juncus xiphioides*), cattail (*Typha* sp.), and watercress (*Rorippa nasturtium-aquaticum*).

Seep habitat with perennial water can provide an important source of water for animals during the dry season, including amphibians such as slender salamander and Pacific ~~chorus frog~~^{treefrog}, California mule deer, raccoon (*Procyon lotor*), and a wide variety of birds.

Freshwater marsh

Freshwater marsh occurs in a fairly narrow band around the shores of the process water ponds in the NW Quadrant of SRRQ and in a small wetland. These marshes support cattails (*Typha*

latifolia), pennyroyal (*Mentha pulegium*), tules (~~*Scirpus* sp.~~), and arroyo willow (*Salix lasiolepis*). The narrow band of emergent marsh vegetation provides limited nesting and foraging opportunities, as well as cover, for a number of bird species and small mammals. Species commonly associated with freshwater marsh include pied-billed grebes (*Podilymbus podiceps*), great blue herons (*Ardea herodias*), great egrets (~~*Ardea alba*~~ *Casmerodius albus*), black phoebe (*Sayornis nigricans*), red-winged blackbird (*Agelaius phoeniceus*), marsh wrens (*Cistothorus palustris*), song sparrows (*Melospiza melodia*), raccoons, and California voles (*Microtus californicus*).

Brackish marsh and salt marsh

Brackish marsh and salt marsh occur in a mosaic in the NW Quadrant of the SRRQ. Both are identified by CNNDDB (2006) as sensitive plant communities. These marshes were once tidal but have since been diked and cut off from tidal influence. The 1899 San Francisco U.S. Geological Survey (USGS) 15 minute topographic quadrangle shows that a road to the McNear's Brickyard was already in place across the bayward edge of the marshes. The road would have been built on a levee so the marshes have been partially to entirely cut off from tidal influence for over 100 years. In 1899, and at least through 1915, the SRRQ marshes were also connected to a much larger area of tidal marsh, which has since been replaced by the Peacock Gap golf and country club. Further examination of historical USGS topographic quadrangles and aerial photographs show that the current Quarry entrance road did not exist in 1942, but had been built by 1968. This means that the easternmost section of the marshes have been cut off from the western sections for nearly 40 years and perhaps up to two decades longer than that. Currently the SRRQ marsh is divided into three sections by the McNear's Brickyard road and the Quarry entrance road and culverts are in place to allow overland runoff to flow from one section to the next and ultimately out to the Bay. There are culverts and tide gates in place at the southwestern corner of the marshes but the tide gates are only opened to allow excess freshwater out during the rainy season, not to allow Bay waters into the marsh (LSA, 2004).

Brackish and salt marshes share plant species in common and most plants in these communities possess morphological adaptations that allow them to inhabit saline soils and to utilize salt water. The salt marsh is dominated by pickleweed (*Salicornia virginiana*), with other typical high marsh species present, including saltgrass (*Distichlis spicata*), fathen (*Atriplex triangularis*), and alkali heath (*Frankenia salina*). Brackish marsh primarily occurs where freshwater input enters the salt marshes along the edges of the roads and berms that form the marsh boundaries, as well as along the remnants of former tidal channels that meander through the marshes and now hold fresh- to brackish water. Brackish marsh is distinguished from salt marsh at SRRQ by the presence of cattails and tules, as well as species such as rabbitsfoot grass (*Polypogon monspeliensis*), pennyroyal, and silverweed cinquefoil (*Potentilla anserina*). Finally, there are several patches of cordgrass marsh along the northwest shoreline of SRRQ near the brickyard entrance. These are primarily composed of native cordgrass (*Spartina foliosa*) but also include several patches of *Spartina densiflora*, an introduced invasive cordgrass species, or hybrids between the two species (ISP, 2004). The Invasive Spartina Project is coordinating an ongoing control program to eradicate the non-native and hybrid cordgrass.

Marsh vegetation in the SRRQ may provide nesting and foraging opportunities and cover for water birds and small mammals, including mallards (*Anas platyrhynchos*), green-winged teals

(*Anas crecca*), great blue herons, great egrets, marsh wrens, San Pablo song sparrows (*Melospiza melodia samuelis*), red-winged blackbirds, raccoons (~~*Procyon lotor*~~), and California voles. Raptors that are typical of brackish marsh habitats include northern harrier (*Circus cyaneus*), red-tailed hawk, white-tailed kite, and American kestrel. It is possible that the SRRQ marshes once were inhabited by what are now special-status species. However, it is unlikely that any of these species could be found in the marshes today. Salt marsh harvest mouse (*Reithrodontomys raviventris*), and Suisun shrew (*Sorex ornatus sinuosus*) occur in high quality emergent wetlands and adjacent upland environments but are not expected to occur at SRRQ due to the degradation of vegetation that has occurred over the long period of adjacent industrial uses, the relatively small size of the marshes, the fact that they have been cut off from tidal circulation for so long, as well as fragmented by the roads crossing them, and their long-standing isolation from other similar habitat (USFWS, 1984). Recent protocol-level surveys for California clapper rail (*Rallus longirostris obsoletus*) were carried out in the SRRQ marshes (ISP, 2004) and the species was not detected. California black rail (*Laterallus jamaicensis*) do not generally occur in smaller marshes in close proximity to urban uses (PRBO, 2002).

The brackish and salt marshes in the northern portions of the SRRQ are mapped as part of the protected Baylands Corridor in the Draft Marin Countywide General Plan (2004).

Seasonal wetland

There are five small seasonal wetlands located at SRRQ. These are shown on Figure 4.3-1 and are located in the northwestern corner of the property, adjacent to the brickyard road; at the northern edge of the property adjacent to Point San Pedro Road; in an excavation or depression in the hillside east of Point San Pedro Road and northeast of the aggregate operations; in a highly disturbed area in the NE Quadrant, to the northeast of the Main Quarry Bowl; and in a draw on the western slopes of South Hill. These wetlands are characterized by indicators of seasonal inundation (algal mats, mineral deposits, and sometimes bare soils) and hydrophytic vegetation, including iris-leaved rush, sedge (*Cyperus eragrostis*), willow, Himalaya blackberry (*Rubus discolor*) Seasonal wetlands such as those located on the project site typically may provide habitat for aquatic invertebrates and hydrophytic plant species. Due to past disturbance and the nature of the wetlands onsite (small size and isolation), it is highly unlikely that they would support special status plants or invertebrates.

Open water

Open water habitat occurs in the process ponds in the NW Quadrant of SRRQ. These ponds likely provide habitat for aquatic invertebrates and may provide habitat for California red-legged frog (*Rana aurora*, = ~~*R. aurora*~~ *draytonii*) and northwestern pond turtle (*Actinemys marmorata marmorata*). These ponds also likely provide foraging habitat for bats and water birds. While California red-legged frog would not be expected to use aquatic habitat located at the bottom of the Main Quarry Bowl in the SE Quadrant due to the extreme disturbance that occurs there, open water habitat also occurs in a process water pond located in the SW Quadrant (see Figure 4.3-1). This water body is unvegetated and surrounded by highly disturbed barren and ruderal habitat, with active mining currently taking place on South Hill to the west. Even so, the species has been observed using similar habitat under similar conditions and therefore the use of the unvegetated process water pond in the SW Quadrant by California red-legged frog cannot be ruled out.

Open Water Estuarine Habitat

The SRRQ is located on Point San Pedro Point and is bounded by open water areas of San Pablo Bay to the northeast, the San Pablo Straight to the southeast, and San Rafael Bay to the southwest. The shoreline adjacent to the San Pablo Straight contains little to no beach during high tides and many areas, particularly at the site of the proposed channel opening, are protected by riprap. Mudflats are present along the China Camp State Park shoreline adjacent to San Pablo

Bay. Water depths immediately offshore of the existing quarry product loading pier range from 6 to 12 feet below Mean Lower Low Water (MLLW).

Although no site-specific fish surveys were conducted in the vicinity of the project site, fish species inhabiting the open water areas of San Pablo and San Rafael Bays are assumed to be similar to those observed throughout much of the San Francisco Bay Estuary. The species composition within the vicinity of the project area is expected to vary by season and regularly changing physical conditions created by the freshwater flow from the San Joaquin and Sacramento Rivers into the Delta. Native fish commonly found within the estuary include such diverse species as starry flounder (*Platichthys stellatus*), California halibut (*Paralichthys californicus*), leopard shark (*Triakis semifasciata*), tule perch (*Hysteroecarpus traski*), Pacific herring (*Clupea harengus pallasii*), northern anchovy (*Engraulis mordax*), sturgeons (*Acipenser* spp.), and anadromous salmonids such as steelhead (*Oncorhynchus mykiss*) and Chinook salmon (*Oncorhynchus tshawytscha*). Non-native fish species in the estuary include striped bass (*Morone saxatilis*), largemouth bass (*Micropterus salmoides*), threadfin shad (*Dorosoma petenense*), and yellowfin gobies (*Acanthogobius flavimanus*).

The benthic invertebrate community of the project vicinity is expected to be composed of various annelids, mysid shrimp, copepods, amphipods, shrimp, crabs and other macroinvertebrates. All of these organisms provide important food sources for estuary fish and birds species.

Riprap occurs along much of the SRRQ coast line and can provide some, but not all, of the habitat values and functions that naturally occurring rocky shore habitat would provide, including a substrate for marine plant and sessile intertidal organisms such as mussels (*Mytilus* sp.) and barnacles. Rocky shore habitat also provides cover for invertebrates such as rock crabs (*Cancer antennarius* and *C. productus*) and for fishes such as plainfin midshipmen (*Porichthys notatus*), which are known seek cover and to spawn under concrete slabs. In addition, existing piles and dock structures at SRRQ may provide an artificial substrate for many species of marine plants, clams, mussels, barnacles, annelids, and crustaceans, all of which are food sources for larger marine invertebrates, fishes, birds, and marine mammals.

Waters of the United States and of the State: Definitions

The term “waters of the United States,” as defined in the Code of Federal Regulations (33 C.F.R. §328.3[a]; 40 C.F.R. §230.3[s]), refers to:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters:

- which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - which are used or could be used for industrial purposes by industries in interstate commerce.
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
 5. Tributaries of waters identified in paragraphs (1) through (4);
 6. Territorial seas; and
 7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).
 8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with Environmental Protection Agency (EPA) (33 CFR §328.3[a][8]).

Wetlands are ecologically productive habitats that support a rich variety of both plant and animal life. The importance of wetlands has increased due to their value as recharge areas and filters for water supplies and to their widespread filling and destruction to enable urban and agricultural development. In a jurisdictional sense, there are two commonly used definitions of a wetland, one definition adopted by the United States Army Corps of Engineers (USACE) and a separate definition, originally developed by United States Fish and Wildlife Service (USFWS), which has been adopted by the agencies in the State of California that have regulatory authority over wetlands. Both definitions are presented below.

Federal Wetland Definition

Wetlands are a subset of “waters of the United States” and receive protection under Section 404 of the Clean Water Act (CWA). Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetland determination under the federal wetland definition adopted by the USACE requires the presence of three factors: (1) wetland hydrology, as defined above under point 2, (2) plants adapted to wet conditions, and (3) soils that are routinely wet or flooded [33 C.F.R. §328.3(b)]. The Supreme Court of the United States recently ruled (January 8, 2001: *Solid Waste Agency of Northwestern Cook County v. United States Army Corps of Engineers et al.*) that certain isolated wetlands do not fall under the jurisdiction of the CWA.

California Wetland Definition

CDFG has adopted the Cowardin *et al.*³ definition of wetlands. The federal definition of wetlands requires three wetland identification parameters to be met, whereas the Cowardin definition can be satisfied under some circumstances with the presence of only one parameter. Thus, identification of wetlands by CDFG consists of the union of all areas that are periodically inundated or saturated, or in which at least seasonal dominance by hydrophytes may be documented, or in which hydric soils are present. The CDFG does not normally assert jurisdiction over wetlands unless they are subject to Streambed Alteration Agreements (California Fish and Game Code Sections 1600-1616) or they support state-listed endangered species.

Jurisdictional Waters at the Project Site

Potentially jurisdictional waters occurring within or adjacent to the SRRQ include wetlands as well as ‘other waters’ as defined above. The waters of San Pablo Bay, the salt and brackish marshes in the NW Quadrant, the freshwater seep in the NE quadrant, the freshwater marshes fringing the process ponds in the NW Quadrant, as well as several seasonal wetlands and ponds described above under wetland habitats may all potentially be considered jurisdictional waters, under both Army Corps of Engineers and CDFG regulations (see Figure 4.3-1 *Habitat Types* for locations of these potentially jurisdictional features). In addition, a previous study (LSA, 2004) identified three potentially jurisdictional drainages on-site. Two of these were not relocated during ESA’s reconnaissance-level surveys for this Environmental Impact Report (EIR), the other is mapped as a freshwater seep (and described above under that heading) rather than a drainage on Figure 4.3-1, since it showed no evidence of an ordinary high water mark or other indications of flow. However, to date no formal wetland delineation has been conducted within the project area. Activities that may result in impacts on these potentially jurisdictional waters will be subject to permitting from a number of agencies (see *Regulatory Setting* discussion).

Special-Status Species

A number of species known to occur in the project vicinity are protected pursuant to federal and/or State endangered species laws, or have been designated Species of Special Concern by the CDFG. In addition, Section 15380(b) of the California Environmental Quality Act (CEQA) *Guidelines* provides a definition of rare, endangered or threatened species that are not included in any listing.⁴ Species recognized under these terms are collectively referred to as “special-status species.” For the purposes of this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened or endangered under the federal or State endangered species acts;
- Species that are candidates for listing under either federal or State law;
- Species formerly designated by the USFWS as Species of Concern or by CDFG as Species of Special Concern;

³ Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. US Fish and Wildlife Service, Office of Biological Services, Washington, D.C. Publ. No. FWS/OBS-79/31.

⁴ For example, vascular plants listed as rare or endangered or as List 1 or 2 by the CNPS are considered to meet Section 15380(b).

- Species protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711);
- Species such as candidate species that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA *Guidelines*.

Appendix E provides comprehensive lists of the special status species that have been documented from, or have potential to occur in suitable habitat within, the general project area. These lists were obtained from the California Natural Diversity Database (CDFG, 2006), California Native Plant Society (CNPS) Electronic Inventory (CNPS, 2006), and the U.S. Fish and Wildlife Service (USFWS, 2006). Based on ESA's review of the biological literature of the region, previous EIRs and surveys in the project vicinity, and an evaluation of the habitat conditions of the existing and proposed project sites, many of these species were eliminated from further evaluation because (1) the project site or the immediate area does not provide suitable habitat, or (2) the known range for a particular species is outside of the project site and/or the immediate area.

The special status species list presented in Table ~~E-1A-1~~ in Appendix E includes species for which potential habitat (i.e. general habitat types) occurs within or in the vicinity of the various project sites. Species determined to have low potential to occur at SRRQ are listed in Table ~~E-1A~~ in Appendix E with the reasoning behind the determination and are not expected to occur at SRRQ. Species observed or with a moderate to high potential to occur at SRRQ are discussed in detail below.

Species Assessed in Detail

Potential impacts of the project on special status species were assessed based on the literature review, professional judgment, and the following criteria:

- 1) A determination of susceptibility. This determination is a three-level process that evaluated for each species: a) potential occurrence in the study area (generally, the terrestrial and aquatic habitats of the project site); b) potential occurrence within the project footprint; or, c) absence from either the study area or proposed construction sites. If the species was determined unlikely to be found in the study area, for example, if no potential habitat exists for the species in the project vicinity, then the species was given no further consideration.
- 2) If a species was determined to have the potential to occur in the project study area, further analyses were made of life history and habitat requirements, as well as the suitability of habitat for the species found within the study area or its immediate vicinity. The results of this determination for each species are provided in the "Potential for Occurrence" column of Table ~~E-1A-1~~ in Appendix E.
- 3) If suitable habitat was determined present within the proposed project vicinity and the species has been documented as observed within the project area or has at least a moderate potential to occur, additional analysis considered whether the species would be impacted by the project. Both direct effects (e.g., displacement of habitat) and indirect effects (e.g. noise) were considered. In addition, life history and habitat requirements were evaluated to ascertain the likelihood and severity of impact.

Of the special-status plants and animals presented in Table ~~E-1A-1~~ in Appendix E, along with the regulatory basis for their status, only the following species, which were observed or determined to

have a moderate to high potential to occur within the project vicinity, were fully considered in the impact analysis:

- Gairdner's yampah
- Point Reyes bird's beak
- Monarch butterfly
- Mimic tryonia
- Steelhead
- Chinook salmon
- Delta smelt
- Green sturgeon
- Longfin smelt
- Sacramento splittail
- Pacific herring
- California red-legged frog
- Northwestern Pond Turtle
- Brown pelican
- Great horned owl
- Northern harrier
- Red-tailed hawk
- Red-shouldered hawk
- Saltmarsh common yellowthroat
- San Pablo song sparrow
- Townsend's big-eared bat
- Yuma myotis
- Fringed myotis
- Long-eared myotis
- Harbor seal
- California sea lion

These species are described in detail below.

Special-Status Plants

Gairdner's yampah (*Perideridia gairdneri*). This former federal species of concern and CNPS List 4.2 plant, is found throughout coastal California and, while it is rare in the southern part of its range, can be locally common in the northern part of the state (CNPS, 2006). Gairdner's yampah, a member of the carrot family (Apiaceae), is a perennial herbaceous plant with rose-pink to white flowers borne in dense heads. This species can be found at elevations ranging from 0 to 3,000 meters in a variety of mesic habitats, including coastal grasslands, and is documented from Lake Lagunitas and Tomales Bay in Marin County. Gairdner's yampah is threatened by agriculture and urbanization.

Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*). This species is a CNPS List 1B.2 species and a former federal species of concern. This member of the Orobanchaceae family grows just above the high tide level in salt marshes and is described from coastal salt marshes bordering San Pablo Bay. The species has an annual life cycle, and is hemiparasitic.⁵ Point Reyes bird's beak hosts are most likely other salt marsh species, including pickleweed, saltgrass, fleshy jaumea, and California sea lavender. Point Reyes bird's-beak flowers are white with a pink/purple lower lip and purplish-green foliage. Yellow-lipped flowers and green foliage are occasionally found.

Special-Status Animals

Invertebrates

Monarch butterfly (*Danaus plexippus*). These bright orange and black butterflies make massive migrations from August-October, flying thousands of miles south to hibernate along the California coast and in central Mexico. Along the way, Monarchs stop to feed on flower nectar and to roost together at night and can be found in many open habitats including fields, meadows, weedy areas, marshes, and roadsides. At wintering sites, these butterflies roost in trees and form

⁵ A *hemiparasitic* plant grows on the roots of other plants (the host plant) but, unlike some other parasitic plants (termed *holoparasites*), is also capable of photosynthesis.

huge aggregations that may have thousands to millions of individuals. Monarchs have been known to use eucalyptus trees at McNear's Beach County Park as stop-over locations in the Fall but not as a wintering roost (CNDDDB, 2006). Wintering roosts are protected by CDFG. While this species may be found at SRRQ as a migrant, there are no records of wintering roosts located at the site.

Mimic tryonia (*Tryonia imitator*). This snail is found in subtidal zones in coastal lagoons and saltmarshes from Sonoma to San Diego Counties. It inhabits permanently submerged areas in a variety of sediment types and is able to withstand a wide range of salinities. Mimic tryonia is documented from the marshes at China Camp as well as along the San Rafael Bay coastline.

Fish

Central Valley and central California coast steelhead (*Oncorhynchus mykiss*). Steelhead populations in the Central California Coast ESU and Central Valley Distinct Population Segments (DPS) are listed as threatened under FESA. Steelhead possess the ability to spawn repeatedly, maintaining the mechanisms to return to the Pacific Ocean after spawning in freshwater. Juvenile steelhead may spend up to four years residing in fresh water prior to migrating to the ocean as smolts. Both steelhead DPSs migrate through San Pablo Straight waters between freshwater spawning and rearing areas and the Pacific Ocean, and may therefore seasonally occur in the waters of the project site.

Sacramento River winter-run, Central Valley spring-run, and Central Valley fall/late fall-run Chinook Salmon (*Oncorhynchus tshawytscha*). The population of Chinook salmon in San Francisco Bay is comprised of three distinct races: winter-run, spring-run, and fall/late fall-run. These races are distinguished by the seasonal differences in adult upstream migration, spawning, and juvenile downstream migration. Chinook salmon are anadromous fish, spending three to five years at sea before returning to fresh water to spawn. These fish pass through San Francisco Bay waters to reach their upstream spawning grounds. In addition, juvenile salmon migrate through the Bay en route to the Pacific Ocean.

Sacramento River winter-run Chinook salmon, listed as both state and federally endangered, migrate through San Francisco Bay from December through July with a peak in March (Moyle, 2002). Spawning is confined to the mainstem Sacramento River and occurs from mid-April through August (Moyle, 2002). Juveniles emerge between July and October, and are resident in their natal stream 5-10 months followed by an indeterminate residency period in estuarine habitats (Moyle, 2002).

The state and federal-listed threatened Central Valley spring-run Chinook salmon migrate to the Sacramento River from March to September with a peak spawning period between late August and October (Moyle, 2002). Juvenile salmon emerge between November and March, and are resident in streams for a period of 3 to 15 months before migrating to downstream habitats (Moyle, 2002).

The Central Valley fall/late fall-run Chinook salmon is a federal candidate for listing, and a California Species of Special Concern. These salmon enter the Sacramento and San Joaquin

Rivers from June through December and spawn from October through December, with a peak in November.

Adult and juvenile (smolts) winter-run, spring-run, and fall-run Chinook salmon are known to occur in waters adjacent to the project area during migrations to upstream freshwater spawning habitat.

Delta smelt (*Hypomesus transpacificus*). A federal and state-listed threatened species, Delta smelt is a small, slender-bodied fish which is able to tolerate a wide salinity range and is native to the Sacramento-San Joaquin estuary. The fish live in schools and primarily feed on planktonic crustaceans, small insect larvae and mysid shrimp (Moyle, 2002). This species, which has a one-year life span, live primarily along the freshwater edge of the saltwater-freshwater interface of the Sacramento-San Joaquin Delta. Prior to spawning, Delta smelt migrate upstream from the brackish-water habitat to river channels and tidally influenced backwater sloughs to spawn. Migration and spawning occur between December and June (Moyle, 2002). The species has been collected in large quantities in Suisun Bay, San Pablo Bay and at the Pittsburgh and Contra Costa power plants. The Delta smelt has no commercial or recreational value, but is considered a key indicator species of the environmental health of the Delta.

Green sturgeon (*Acipenser medirostris*). The southern DPS of green sturgeon is a federal threatened species. This anadromous fish is the most widely distributed member of the sturgeon family and the most marine-oriented of the sturgeon species. Green sturgeons range in the nearshore waters from Mexico to the Bering Sea and are common occupants of bays and estuaries along the western coast of the United States (Moyle et al., 1995). Adults in the San Joaquin Delta are reported to feed on benthic invertebrates including shrimp, amphipods and occasionally small fish (Moyle et al., 1995) while juveniles have been reported to feed on opossum shrimp and amphipods. Adult green sturgeons migrate into freshwater beginning in late February with spawning occurring in March through July, with peak activity in April and June. After spawning, juveniles remain in fresh and estuarine waters for 1-4 years and then begin to migrate out to the sea (Moyle et al., 1995). The upper Sacramento River has been identified as the only known spawning habitat for green sturgeon in the southern DPS. Although green sturgeons are caught and observed in the lower San Joaquin River, no spawning is known to occur within the river.

Longfin smelt (*Spirinchus thaleichthyes*). A California Species of Special Concern, Longfin smelt is a small schooling fish that inhabits the freshwater section of the lower Delta and has been observed from south San Francisco Bay to the Delta, with the bulk of the San Francisco Bay population occupying the region between the Carquinez Strait and the Delta (McAllister, 1963; Miller and Lea, 1972). They have been collected in large numbers in Montezuma Slough, Suisun Bay and near the Pittsburgh and Contra Costa power plants. In the fall, adults from San Francisco and San Pablo Bays migrate to fresher water in the Delta to spawn. The spawning habits of longfin smelt are similar to the Delta Smelt and both species are known to school together. Larval stages are known to inhabit Suisun Bay and move down bay as they grow larger in April and May (Granssle, 1966). The larvae are pelagic and found in the upper layers of the water column. Longfin smelt are harvested commercially and sold in local markets. Longfin smelt are known to be present in San Pablo Bay adjacent to the project area.

Sacramento splittail (*Pogonichthys macrolepidotus*). A federal Species of Concern and State Species of Special Concern, Sacramento splittail are primarily freshwater fish, but are tolerant of moderate salinity of up to 10-18 parts per thousand (ppt). In the 1950s, they were commonly caught by striped bass anglers in Suisun Bay, and prior to 1985, they were also common San Pablo Bay. During the past 20 years, however, they have been found mostly in slow-moving sections of rivers and in sloughs and have been most abundant in the Suisun Bay and Marsh region. Adults migrate upstream from brackish areas to spawn in freshwater. Spawning begins by late January and early February and continues through July, with most spawning taking place from February through April. Splittail spawn on submerged vegetation in temporarily flooded upland and riparian habitat. Typically, terrestrial shrubs and herbs are preferred over emergent wetland vegetation such as cattails and tules. Spawning occurs in the lower reaches of rivers, bypasses used for flood management, dead-end sloughs and in the larger sloughs such as Montezuma Slough. Larvae remain in the shallow, weedy areas inshore near the spawning sites and move into the deeper offshore habitat as they mature. Although the project site is somewhat south of the current range of the species, Sacramento splittail may occasionally occur in the vicinity.

Pacific herring (*Clupea pallasii*). Protected under the Magnuson-Stevens Fishery Conservation and Management Act, Pacific herring is both a popular sport fish and a commercially important species. The Pacific herring is a small schooling marine fish that enters estuaries and bays to spawn. This species is known to spawn along the Oakland and San Francisco waterfronts and attach its egg masses to eelgrass, seaweed, and hard substrates such as pilings, breakwater rubble, and other “hard surfaces”. Spawning usually takes place between October and March with a peak between December and February. After hatching, juvenile herring typically congregate in San Francisco Bay during the summer and move into deeper waters in the fall. In San Francisco Bay, eel grass is not abundant, and herring are known to broadcast eggs on rocks, rocky jetties, pilings, sandy beaches, and other submerged objects (Eldridge and Kaill, 1973). An individual can spawn only once during the season, and the spent female returns to the ocean immediately after spawning. Pacific herring may seasonally be present in the vicinity of the proposed project area.

Amphibians

California red-legged frog (*Rana aurora draytonii*). This species is listed as federally threatened and as a California Species of Special Concern. The project site does not occur within either of the two designated critical habitat units in Marin County. Red-legged frogs reside in lowlands and foothills in or near permanent or semi-permanent water sources, such as lakes, stock ponds, and slow moving streams with deep pools and dense shrubs or emergent aquatic vegetation. Where water sources are not permanent, red-legged frogs require access to dry-season upland aestivation habitat in the form of mammal burrows. Red-legged frogs require at least 11 weeks of permanent water after egg laying for larval development.

Reptiles

Northwestern pond turtle (*Actinemys marmorata marmorata*). The northwestern pond turtle, a federal Species of Concern and California Species of Special Concern, is a thoroughly aquatic turtle found in permanent ponds, rivers, streams, channels, and irrigation ditches with rocky or muddy bottoms, and emergent vegetation. Basking areas used by this species include partially

submerged logs, rocks, vegetation mats, and open mud banks. Habitat destruction and stream course degradation are the primary threats to this species. Potentially suitable habitat for this species occurs in and on the banks of the process ponds in the NW Quadrant of the SRRQ.

Birds

Brown pelican (*Pelecanus occidentalis*). The brown pelican is a regular summer and fall migrant to San Francisco Bay and, in some years, these birds can be found in the Bay year-round. Brown pelicans are often seen foraging in deep water and channel habitat or perched on pilings or docks.

Great horned owl (*Bubo virginianus*). Great horned owls occur throughout North America and are found in a variety of wooded habitats. These large raptors prey on small to medium-sized mammals such as voles, rabbits, skunks, and squirrels. Great horned owls can often be seen and heard at dusk, perched in large trees. They roost and nest in large trees such as pines or eucalyptus. They often use the abandoned nests of crows, ravens, or sometimes squirrels (Erlich et al., 1988; Sibley, 2000). Great horned owls may use large eucalyptus located within or adjacent to the project area for roosting or nesting and may forage over grassland and marsh habitat in the northern and southwestern portions of the SRRQ for voles and other small mammals.

Northern harrier (*Circus cyaneus*). This species, like other raptors and birds in general, is protected under California Code 3503 and 3503.5, which prohibits the taking or destroying of any bird or nest in the order of Falconiformes (falcons, kites, and hawks) and Strigiformes (owls). Northern harriers nest and forage along wet meadows, sloughs, savanna, prairie, and marshes, feeding on small mammals, such as California vole and mice. Destruction of marsh habitat is the primary reason for the decline of this species. Northern harrier may use the marshes and grasslands in the northern portions of the project site and surrounding area for foraging and nesting.

Red-tailed hawk (*Buteo jamaicensis*). Red-tailed hawks are commonly found in woodlands and open country with scattered trees. These large hawks feed primarily on small mammals, but will also prey on other small vertebrates, such as snakes and lizards, as well as on small birds and invertebrates. Red-tailed hawks nest in a variety of trees in urban, woodland, and agricultural habitats. Large coast live oaks, as well as taller non-native trees such as eucalyptus, may be used by red-tailed hawks for nesting in woodlands within and adjacent to the SRRQ.

Red-shouldered hawk (*Buteo lineatus*). Red-shouldered hawks are relatively common in both rural and urban situations and can be found in residential neighborhoods and along riparian corridors or other waterbodies. These hawks hunt primarily for mammals, reptiles, and amphibians (Sibley, 2001). Large eucalyptus provide potential nesting habitat for this species within the project area.

Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*). The common yellowthroat is a small warbler with a complex of subspecies. The salt marsh subspecies is recognized as a distinct breeding population, with geographic distribution, habitats, and subtle differences in morphological traits that distinguish it from other subspecies. It inhabits tidal salt and brackish marshes in winter, but breeds in freshwater to brackish marshes and riparian woodlands during

spring to early summer. Nests are placed on or near the ground in dense emergent vegetation or shrubs. The subspecies is a federal and state species of concern due to major decline of both habitat and populations in the past decade, but is not currently listed as endangered or threatened. The common yellowthroat is also protected under the Migratory Bird Treaty Act.

San Pablo song sparrow (*Melospiza melodia samuelis*). San Pablo song sparrow is one of three morphologically distinct song sparrow subspecies that occur in the San Francisco Bay region. This particular subspecies is endemic to the marshes bordering San Pablo Bay and is a federal and state Species of Concern. Intermixed stands of bulrush (*Scirpus* spp.), cattail (*Typha* spp.), and other emergent vegetation provide suitable habitat in brackish marshes. San Pablo song sparrows nest in tall tules with local pickleweed. They also frequent tall vegetation along the edges of tidal marshes and forage on mudflats and channel beds exposed at low tide.

Mammals

Special status bat species. The project site provides potential foraging and roosting habitat for four special-status bat species. **Pacific western big-eared bats** (*Corynorhinus townsendii townsendii*) occur in a variety of habitats and utilize caves, mines, tunnels, buildings, or other human-made structures for roosting. **Yuma myotis** (*Myotis yumanensis*) also roost in buildings and mines and have been observed roosting in abandoned swallow nests and under bridges (Zeiner et al, 1990). The **fringed myotis** (*Myotis thysanodes*) occurs throughout California and is most frequent in coastal and montane forests and near mountain meadows (Jameson and Peeters, 1988). This species uses echolocation to find moths, beetles, and other prey and forms nursery colonies in caves and old buildings (Jameson and Peeters, 1988). The **long-eared myotis** (*Myotis evotis*) inhabits nearly all brushlands, woodlands, and forests, seeming to prefer coniferous forests and woodlands. Roosts include caves, buildings, snags, and crevices in tree bark. This species is highly maneuverable in its forays for arthropods over water, open terrain, and in habitat edges. These bat species may utilize vacant buildings or eucalyptus trees for roosting in the southern portion of the project site and forage over marsh habitat. Bats are known to use the abandoned McNear's Brickyard kiln chimneys for roosting and the chimneys may also support maternity colonies.

Marine mammals. Habitat for two marine mammals, the **harbor seal** (*Phoca vitulina richardsi*) and the **California sea lion** (*Zalophus californianus*), may occur at the project site. Both species are considered special-status species and are protected under the federal Marine Mammal Protection Act (MMPA). Populations of both species are known to occur within San Francisco Bay and along its corresponding shoreline. Foraging individuals of both species are known to travel as far upstream as the City of Sacramento during spring and fall salmon migrations. Foraging sites for these species are generally close to shore where medium-sized fish, crab, and herring are taken as prey. Although highly unlikely, it is possible that the future structures and/or marina slips in the project area could be used as haul-out sites for these species, though such use would be unlikely given the availability of better haul-out habitat throughout the Bay and Delta.

Sensitive Natural Communities

The CNDDDB lists several sensitive natural communities as occurring in the U.S. Geological Survey quadrangles searched, including coastal brackish marsh, northern coastal salt marsh, coastal terrace prairie, and serpentine bunchgrass grassland. Of these communities, as described by Holland (1986), coastal brackish marsh and northern coastal salt marsh occur in the vicinity of SRRQ. In addition, coastal and valley freshwater marsh, also listed as a sensitive community by the CNDDDB, occurs on-site. Other wetland habitat types on-site, including seasonal wetlands, ponds, and freshwater seeps are also generally considered sensitive by CDFG and the U.S. Army Corps of Engineers (USACE).

Designated Critical Habitat

The National Marine Fisheries Services (NMFS) designated critical habitat for Sacramento winter-run Chinook salmon on June 16, 1993 (NMFS, 1993) and for central California coast steelhead, Central Valley steelhead, and Central Valley spring-run Chinook salmon on September 2, 2005 (NMFS, 2005). The proposed project area is located within designated critical habitat for these species.

Regulatory Setting

This section briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they apply to the proposed project.

Special-Status Species

Federal Endangered Species Act

The USFWS, which has jurisdiction over plants, wildlife, and most freshwater fish, and the National Marine Fisheries Service (NMFS), which has jurisdiction over anadromous fish, marine fish, and mammals, oversee implementation of the Federal Endangered Species Act (FESA). Section 7 of the Act mandates that all federal agencies consult with the USFWS and NMFS to ensure that federal agencies actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. A federal agency is required to consult with USFWS and NMFS if it determines a “may effect” situation will occur in association with the proposed project. The FESA prohibits the “take”⁶ of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder species recovery.

Under Section 9 of the FESA, the take prohibition applies only to wildlife and fish species. However, Section 9 does prohibit the removal, possession, damage or destruction of any endangered plant from federal land. Section 9 also prohibits acts to remove, cut, dig up, damage, or destroy an endangered plant species in nonfederal areas in knowing violation of any state law

⁶ “Take,” as defined in Section 9 of the FESA, is broadly defined to include intentional or accidental “harassment” or “harm” to wildlife. “Harass” is further defined by the U.S. Fish and Wildlife Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering. “Harm” is defined as an act which actually kills or injures wildlife. This may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

or in the course of criminal trespass. Candidate species and species that are proposed or under petition for listing receive no protection under Section 9 of the FESA.

Section 10 of the FESA requires the issuance of an “incidental take” permit before any public or private action may be taken that would potentially harm, harass, injure, kill, capture, collect, or otherwise hurt (i.e., take) any individual of an Endangered or Threatened species. The permit requires preparation and implementation of a habitat conservation plan that would offset the take of individuals that may occur, incidental to implementation of the project by providing for the overall preservation of the affected species through specific mitigation measures.

Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs.

Federal Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) is the principal Federal legislation that guides marine mammal species protection and conservation policy. The MMPA delegates authority for oceanic marine mammals to the Secretary of Commerce, the parent agency of the National Oceanic and Atmospheric Administration (NOAA). Species of the order Cetacea (whales and dolphins) and species, other than walrus, of the order Carnivora, suborder Pinnipedia (seals and sea lions), are the responsibility of NMFS. The Department of the Interior's Fish and Wildlife Service is responsible for the dugong, manatee, polar bear, sea otter, and walrus. Marine mammals that are already managed under international agreements are exempt as long as the agreements further the purposes of the MMPA.

The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S.

Federal Essential Fish Habitat

The Sustainable Fisheries Act of 1996 (Public Law 104-297), amended the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to establish new requirements for Essential Fish Habitat (EFH) descriptions in federal Fisheries Management Plans (FMPs) and to require federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect EFH. The Magnuson-Stevens Act requires all fishery management councils to amend their FMPs to describe and identify EFH for each managed fishery. The Act also requires consultation for all federal agency actions that may adversely affect EFH (i.e., direct versus indirect effects); it does not distinguish between actions in EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside of EFH, such as upstream and upslope activities that may have an adverse effect on EFH. Therefore, EFH consultation with NMFS is required by federal agencies undertaking, permitting, or funding activities that may adversely affect EFH,

regardless of the activity's location. Under section 305(b)(4) of the Magnuson-Stevens Act, NMFS is required to provide EFH conservation and enhancement recommendations to federal and state agencies for actions that adversely affect EFH. However, state agencies and private parties are not required to consult with NMFS unless state or private actions require a federal permit or receive federal funding. Although the concept of EFH is similar to that of critical habitat under the FESA, measures recommended to protect EFH by NMFS are advisory, not proscriptive.

NMFS strongly encourages efforts to streamline EFH consultation and other federal consultation processes. EFH consultation can be consolidated, where appropriate, with interagency consultation, coordination and environmental review procedures required by other statutes such as the National Environmental Policy Act (NEPA), Fish and Wildlife Coordination Act, Clean Water Act, FESA, and Federal Power Act. EFH consultation requirements can be satisfied using existing review procedures if they provide NMFS timely notification of actions that may adversely affect EFH and the notification meets requirements for EFH Assessments (i.e., a description of the proposed action, an analysis of the effects, and the Federal agency's views regarding the effects of the action on EFH and proposed mitigation, if applicable).

California Environmental Quality Act

The intent of the California Environmental Quality Act (CEQA) is to maintain "high-quality ecological systems and the general welfare of the people of the state." It is the policy of the state to "prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities and examples of the major periods of California history." CEQA forbids agencies from approving projects with significant adverse impacts when feasible alternatives or feasible mitigation measures can substantially reduce such impacts.⁷

CEQA requires consultation with CDFG on any project an agency initiates that is not statutorily or categorically exempt from CEQA. The CEQA *Guidelines* (Section 15065a) indicate that impacts to state- and federally listed rare, threatened, or endangered plants or animals are significant. Under Section 15380 of the CEQA *Guidelines*, impacts to other species that meet certain criteria (i.e. it can be shown that the species' survival in the wild is in jeopardy or it is at risk of becoming endangered in the near future) but are not officially listed may also be considered significant by the lead agency (for an EIR), depending on the applicability of other laws (e.g., Migratory Bird Treaty Act) and the discretion of the agency. For example, CDFG interprets Lists 1A, 1B, and 2 of the California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California* to consist of plants that, in a majority of cases, would qualify for listing as rare, threatened, or endangered. However, the determination of whether an impact is significant is a function of the lead agency, absent the protection of other laws. Projects

⁷ CEQA also provides that a project might be approved in spite of residual, unmitigated significant impacts, by adoption of a statement of overriding social and economic considerations in situations where mitigations or alternatives are deemed infeasible.

subject to CEQA review must specifically address potential impacts to listed species and provide mitigation measures if the impact is significant.

California Endangered Species Act

Under the California Endangered Species Act (CESA), CDFG has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code 2070). CDFG also maintains a list of “candidate species,” which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, CDFG maintains lists of “species of special concern,” which serve as “watch lists.” Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species could be present on the project site and determine whether the proposed project could have a potentially significant impact on such species. In addition, CDFG encourages informal consultation on any proposed project that may impact a candidate species.

California Environmental Quality Act Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA *Guidelines* section 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in the FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in the CEQA *Guidelines* primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a “candidate species” that has not yet been listed by either the USFWS or CDFG. Thus, CEQA provides an agency with the ability to protect a species from a project's potential impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed CDFG to carry out the legislature’s intent to “preserve, protect, and enhance endangered plants in this state.” The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The California Endangered Species Act expanded upon the original NPPA and enhanced legal protection for plants. CESA established threatened and endangered species categories, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

California Fish and Game Code

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.3 of the California Fish and Game Code prohibits

take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs.

Fish and Game Code Sections 3511 birds, 4700 mammals, 5050 reptiles and amphibians and 5515 fish) allows the designation of a species as Fully Protected. This is a greater level of protection than is afforded by the California Endangered Species Act, since such a designation means the listed species cannot be taken at any time.

Special-Status Natural Communities

Special-status natural communities are identified as such by CDFG's Natural Heritage Division and include those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The California Natural Diversity Database (CNDDDB) tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site in terms of its location, extent, habitat quality, level of disturbance, and current protection measures. CDFG is mandated to seek the long-term perpetuation of the areas in which these communities occur. While there is no statewide law that requires protection of all special-status natural communities, CEQA requires consideration of the potential impacts of a project to biological resources of statewide or regional significance.

Jurisdictional Waters Including Wetlands

U.S. Army Corps of Engineers and U.S. Environmental Protection Agency

The USACE and EPA regulate the discharge of dredged or fill material into waters of the United States, including wetlands, under Sections 404 and 401 of the Clean Water Act (CWA). Projects that would result in the placement of dredged or fill material into waters of the U.S. (see definitions on pp. 4.3-9 through 4.3-11) require a Section 404 permit from the USACE. Based on the Supreme Court ruling (Solid Waste Agency of Northern Cook County [SWANCC]) concerning CWA jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters are no longer defined as waters of the United States based solely on the use of such waters by migratory birds. However, jurisdiction over non-navigable, isolated, intrastate waters may be claimed if their use, degradation, or destruction could affect other waters of the U.S., or interstate or foreign commerce and such waters are currently analyzed on a case-by-case basis. A more recent Supreme Court case, *Rapanos v. United States* (2006), also questioned the definition of "waters of the United States" and the scope of federal regulatory jurisdiction over such waters, but left open the question as to whether the CWA extends to those waters and wetlands that have a 'significant nexus' to navigable waters of the United States, or whether it is limited to waters with a continuous connection. The implications of this ruling are still being tested in the courts and on June 5, 2007 the EPA and the USACE released guidance on CWA jurisdiction in response to the Rapanos Supreme Court decisions. This guidance can be used to support a finding of CWA coverage for a particular water body when either a) there is a significant nexus between the stream or wetland in question and navigable waters in the traditional sense; or b) a relatively permanent water body is hydrologically connected to traditional navigable waters and/or a wetland has a surface connection with that water.

Some classes of fill activities may be authorized under General or Nationwide permits if specific conditions are met. Nationwide permits do not authorize activities that are likely to jeopardize the existence of a Threatened or Endangered species (listed or proposed for listing under the FESA). In addition to conditions outlined under each Nationwide Permit, project-specific conditions may be required by the USACE as part of the Section 404 permitting process. When a project's activities do not meet the conditions for a Nationwide Permit, an Individual Permit may be issued.

Section 401 of the Clean Water Act requires an applicant for a USACE permit to obtain state certification that the activity associated with the permit will comply with applicable state effluent limitations and water quality standards. In California, water quality certification, or a waiver, must be obtained from the Regional Water Quality Control Board, for both Individual and Nationwide Permits.

The USACE also regulates activities in navigable waters under Section 10 of the Rivers and Harbors Act. The construction of structures, such as tidegates, bridges, or piers, or work that could interfere with navigation, including dredging or stream channelization, may require a Section 10 permit, in addition to a Section 404 permit if the activity involves the discharge of fill.

Finally, the federal government also supports a policy of minimizing "the destruction, loss, or degradation of wetlands." Executive Order 11990 (May 24, 1977) requires that each federal agency take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

State Policies and Regulations

State regulation of activities in waters and wetlands resides primarily with the CDFG and the State Water Resources Control Board (SWRCB). In addition, the California Coastal Commission has review authority for wetland permits within its planning jurisdiction. CDFG provides comment on USACE permit actions under the Fish and Wildlife Coordination Act. CDFG is also authorized under the California Fish and Game Code, Sections 1600-1616, to enter into a Streambed Alteration Agreement with applicants and develop mitigation measures when a proposed project would obstruct the flow or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent and ephemeral streams. The SWRCB, acting through the nine Regional Water Quality Control Boards, must certify that a USACE permit action meets state water quality objectives (Section 401, Clean Water Act).

Bay Conservation and Development Commission

The Bay Conservation and Development Commission (BCDC) is authorized by the McAteer Petris Act to analyze, plan and regulate San Francisco Bay and its shoreline. It implements the San Francisco Bay Plan, and regulates filling and dredging in the Bay, its sloughs and marshes, and certain creeks and their tributaries. BCDC jurisdiction includes the waters of the Bay as well as a shoreline band that extends inland 100 feet from the high tide line. Any fill, excavation of material, or substantial change in use within BCDC jurisdiction requires a permit from BCDC.

The Marin Countywide Plan Update (2007)

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to aesthetics and visual quality are discussed in Section 4.6, Land Use and Planning.

Other Plans and Polices

Marin County Native Tree Preservation and Protection Ordinance

Marin County has adopted a native tree protection and preservation ordinance (Ordinance 3342, adopted May 16, 2002) that defines “protected trees” and prohibits their removal without a permit. However, removal of trees within an approved mining area or as part of an approved mine reclamation plan does not require a permit.

Impacts and Mitigation Measures

Significance Criteria

Consistent with policy and guidance provided by the County of Marin EIR Guidelines, Appendix N, and CEQA (Public Resources Code §21001 and CEQA *Guidelines* Appendix G Checklist), an effect of the proposed project would be considered significant if it causes one or more of the following impacts:

- Adverse substantial effect to any species identified as a threatened, endangered, candidate, sensitive, or special-status species in local or regional plans, policies, regulations or by lists of species of concern from the CDFG, the USFWS, or as defined by CEQA *Guidelines* §15380;
- Adverse substantial effect to habitat (including habitats for rare and endangered species as defined by California Fish and Game Code 903) or other sensitive natural communities identified in local or regional plans, policies, regulations, or lists compiled by CDFG or USFWS;
- Substantial interference with movement of any native resident or migratory fish or wildlife species, with established migration or dispersal corridors, or with the use of native wildlife nursery sites;
- Adverse substantial effect to federally or State protected wetlands (including but not limited to marshes and riparian areas) as defined by Section 404 of the Clean Water Act, or riparian and marsh areas under the jurisdiction of CDFG as defined by California Fish and Game Code 1600-1616;
- Conflict with any local plans or ordinances designed to protect biological resources, such as removal or damage to any tree protected under Ordinance 3442 of the Marin County Code;
- Conflict with any applicable habitat conservation plan or natural community plan.

The following CEQA *Guidelines* sections, while not considered significance criteria in their own right provide further guidance on defining significant biological impacts:

- §15065 provides for mandatory findings of significance if projects “...substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, rare or threatened species....”
- §15206 (b) (5) defines projects as being of statewide, regional, or areawide significance if they “would substantially affect sensitive wildlife habitats including but not limited to riparian lands, wetlands, bays, estuaries, marshes, and habitats for endangered, rare, and threatened species as defined by §15380....”
- §15380 states that a plant or animal species, even if not on an official list, may be treated as “rare or endangered” if, for example, it is likely to become so in the foreseeable future.
- §15382 states that a project has a significant effect on the environment if there would be “...a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.”

Approach to Analysis

Potential impacts resulting from implementation of the proposed 2004 Amended Reclamation Plan (ARP04) were evaluated based on a field reconnaissance surveys performed by qualified ESA biologists and a review of the following sources:

- Existing resource maps and aerial photographs of the project site;
- Data presented in the CNDDDB and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California, and an official species list for the SRRQ area from the USFWS (2006);
- Standard biological references (e.g., field guides);
- Previous environmental impact reports, other environmental documents, and resources surveys for the general SRRQ area; and
- Other available literature regarding the natural resources of the area.

For the analysis presented below, impacts resulting from implementation of the ARP04 were considered to be significant if they had the potential to:

- Have a substantial adverse effect on special-status species that were found to have moderate or high potential to occur on or in the vicinity of the SRRQ;
- Result in the fill of or otherwise cause degradation of potentially jurisdictional waters located on or in the vicinity of the SRRQ;
- Have a substantial adverse effect on areas designated as sensitive habitat in this EIR; or
- Otherwise exceed the significance criteria outlined above.

As described in Chapter 3, Project Description, the environmental baseline used to determine significance in this section is based on existing conditions at the time the notices of preparation (NOPs) for the projects were issued. The differences between the existing approved 1982 Amended Reclamation Plan (ARP82) and the proposed ARP04 constitute the ARP project; and the differences between operational conditions as they existed in 1982 and those proposed for the Amended Surface Mining and Quarrying Permit (AQP) constitute the AQP project. This EIR considers the effects of the projects, as they differ from the baseline, on the existing environment at the time of the Notices of Preparation for the two projects.

Impacts of the Amended Reclamation Plan

Impact R4.3-1: Reclamation activities during Phases 1 through 4 will result in the loss of upland ruderal and barren habitat (Less than Significant).

Under Phases 1 through 4 of the reclamation, portions of what is currently ruderal and barren habitat would be utilized for soil stockpiling. Other ruderal and barren areas would be re-contoured, and activities including backfilling, grading, compaction, stabilization and revegetation would take place. The loss of this habitat type does not constitute a significant impact to biotic resources as it is locally and regionally abundant. In addition, these ruderal and barren areas primarily provide habitat for a limited number of common wildlife and non-native plant species and are thus low in diversity and of limited ecological value. In addition, most of the areas that are planned to be disturbed during reclamation grading would also be disturbed under ARP82; therefore, most of the disturbance is already contemplated and approved as part of ARP82. Finally, revegetation with native species will occur as a part of the reclamation process in all phases, for the purposes of erosion control, as well as for long term habitat re-establishment in areas that are to remain as permanent open space. Therefore, this is considered to be a less than significant impact.

Mitigation: None required.

Impact R4.3-2: Reclamation activities during Phases 1 through 4, as well as post-reclamation uses of the site will result in the loss of native vegetation at San Rafael Rock Quarry, including mixed perennial grassland, coastal scrub, and coast live oak woodlands (Significant).

Reclamation activities implemented in Phases 1 through 4, such as soil stockpiling, backfilling, grading, compaction, stabilization and revegetation will result in the loss of native vegetation not contemplated in ARP82, specifically the removal of the small hill south of the brickyard in the NW Quadrant during Phase 4, which will result in the loss of a little over 1 acre of mixed perennial grassland and approximately 2 acres of coastal scrub as well as a minor amount of oak woodland in the SW Quadrant. Since the small hill is not within the area designated for mining in ARP82, nor proposed for mining in ARP04, its removal is neither considered mining, nor does it appear to be necessary for reclamation.

Grading and revegetation in Phase 4 will also result in the removal of small amounts of oak woodland on the ridge just north of the Main Quarry Bowl, and may result in removal of oak woodlands in the vicinity of the current Quarry office buildings in the SW Quadrant. Removal of this vegetation was, however, already contemplated in ARP82, and is therefore not considered a significant impact of ARP04. Other areas of native vegetation are specifically protected in ARP04, which also establishes “Standards for Preserving Sensitive Habitat Areas.”

The removal of the small hill in the NW Quadrant would cause a loss of native vegetation that is inconsistent with policies of the newly-adopted Countywide Plan, and which is considered significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-2a: ARP04 contains ‘Standards for Preserving Sensitive Habitat Areas.’ Implementation of these standards will protect specific areas of oak woodland and native grassland.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-2b: The applicant shall submit to the Marin County Department of Public Works a revised ARP that includes the preservation of the small hill, consistent with ARP82. Any plans for future alteration of the small hill for post-reclamation development may be proposed as part of the final Development Plan, due to be submitted three years prior to the cessation of mining.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-2: The Marin County Department of Public Works shall be responsible for reviewing revisions to ARP04 prior to its adoption.

Level of Significance after Mitigation

The combination of Mitigation Measures R4.3-2a and R4.3-2b will reduce this impact to Less than Significant.

Impact R4.3-3: Reclamation activities implemented in Phases 1 through 4 could result in temporary disturbance to or mortality of Point Reyes bird’s beak and Gairdner’s yampah (Significant).

Two special-status plant species, Point Reyes bird’s beak (CNPS List 1B.2 and former federal species of concern) and Gairdner’s yampah (CNPS List 4.2 and former federal species of concern) have a low to moderate chance for occurrence at SRRQ. While potential habitat has generally been degraded at SRRQ, the native grassland areas of South Hill and on the low ridge south of McNear’s Brickyard, as well as the area of relatively undisturbed non-native grassland in the NE Quadrant known as the Grassy Knoll, provide suitable habitat for Gairdner’s yampah. The salt marshes in the NW Quadrant provide suitable habitat for Point Reyes bird’s beak and since protection of Point Reyes bird’s beak is tied to protection of those marshes, the mitigation measures discussed under Impact R4.3-5 (Jurisdictional waters) will help to ensure that impacts

to this species, if present, are avoided. In addition, if any work at all is to occur within the marshes, such as improving tidal circulation or replacing existing causeways with bridges, then the measures identified below will also apply.

Under ARP04 the native grassland areas on South Hill are to be protected as sensitive habitat through the end of quarrying, as is the Grassy Knoll. However, soil from the low ridge to the south of the McNear's Brickyard is to be removed and the ridge graded to a height of 50 feet, which will destroy the existing mixed perennial grasslands and could result in mortality of Gairdner's yampah as well, if the species is present. If the species is present in this location, this would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-3a: ARP04 delineates areas to be preserved, including portions of South Hill, the Grassy Knoll, and the marsh areas.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-3b: Prior to each reclamation phase and during the planning for post-reclamation development presence/absence surveys for special-status plants will be conducted by a qualified botanist within areas to be disturbed.

- Surveys will be conducted in accordance with CNPS and CDFG rare plant survey guidelines.
- Surveys will be conducted prior to the start of each phase of reclamation activities, during the flowering period when the species is most readily identifiable (June – October).
- The results of the surveys will be filed with the County; if the presence of any of these species is confirmed, a copy of the survey results will be forwarded to CDFG, and Mitigation Measure R4.3-3c will be implemented.
- In the event that special-status plants are proven absent, then no additional mitigation is necessary.

Mitigation Measure R4.3-3c: In the event that special-status plant populations are found during the surveys conducted pursuant to Mitigation Measure R4.3-3b, the project proponent will avoid disturbance to the species by establishing a visible buffer zone of not less than 25 feet prior to construction or by relocating reclamation activities if feasible to avoid disturbance. Where necessary reclamation activities cannot be altered to avoid disturbance, the applicant shall relocate affected special-plant populations and/or restore similar habitat in another location:

- Protection of special status species will be coordinated by a qualified biologist.
- Disturbance or mortality of special status plant habitat and species shall be avoided as a priority. If a qualified biologist determines that restoration would provide equivalent or more effective mitigation, special-status plant habitat and/or sensitive plant communities may instead be restored on-site at a 2:1 ratio in areas that are to

remain as post-reclamation open space, such as the Grassy Knoll or within the salt marshes.

- Special-status plants and/or seeds will be salvaged from areas of disturbance and moved to restoration areas on or off the site; if this is not feasible, an alternate source of seed or plant material will be selected by a qualified biologist.
- A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards will include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and a functioning, self-sustaining plant community at the end of five years.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-3: The County DPW shall be responsible for ensuring that special status plant surveys are conducted prior to planned disturbance, for ensuring implementation of Mitigation Measure R4.3-3 in the event that species presence is affirmed, and for making a final determination of success.

Level of Significance after Mitigation

The combination of Mitigation Measures R4.3-3a, R4.3-3b, and R4.3-3c will reduce this impact to Less than Significant.

Impact R4.3-4: Reclamation activities implemented in Phases 1 through 4, as well as post-reclamation development could result in damage to or removal of protected trees that are within or adjacent to areas to be reclaimed or developed (Significant).

The south side of South Hill is dominated by oak woodlands. Under ARP04 these woodlands are designated for protection throughout the reclamation and later development process and most of the trees comprising this woodland will therefore be protected, although the potential for damage to some trees resulting from reclamation activities exists.

Trees that occur immediately adjacent to areas that will be disturbed during reclamation activities may be damaged by excavating, grading, soil compaction, and movement of equipment and vehicles. Extensive damage to branches, trunks, or roots has the potential to result in tree mortality. The closer the reclamation activity is to the trunk of the tree, the greater the potential for damage. Each root that is damaged reduces the tree's capacity to supply water and nutrients to its leaves. Damage to protected trees outside of areas already designated for mining or reclamation would be a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-4a: ARP04 delineates areas to be preserved, including portions of South Hill and the Grassy Knoll.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-4b: Implement Mitigation Measure 4.3-2b to protect the trees located on the small hill in the NW Quadrant.

Mitigation Measure R4.3-4c: The applicant will implement the following measures in order to minimize damage to protected trees that are to be preserved on-site:

- Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, preserved trees that occur adjacent to project construction areas shall be identified as preserved and clearly delineated by constructing short post and plank walls, or other protective fencing material, at the dripline of each tree.
- The delineation markers shall remain in place for the duration of the work.
- Where reclamation activities would encroach upon the dripline of a preserved tree, special construction techniques will be required to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, use of hand equipment for tunnels and trenching, and/or allowance of only one pass through a tree's dripline). Tree wells or other techniques may be used.
- The following shall not occur within the dripline of any retained tree: parking; storage of vehicles, equipment, machinery, stockpiles of excavated soils, or construction materials; or dumping of oils or chemicals.
- If a tree within a preserved area is damaged or destroyed, the applicant shall replace the tree at a ratio of 2:1 with trees of the same species. Tree replacement shall be performed by a certified arborist.

Mitigation Measure R4.3-4d: All pruning activities of preserved trees shall be performed by a certified arborist. No more than 25 percent of a tree's canopy shall be removed during pruning activities of retained trees.

Mitigation Measure R4.3-4e: The project proponent shall develop and implement a five-year monitoring program for any required replacement plantings, as specified in Mitigation Measure R4.3-4c. The performance standards for tree replacement include all of the following: 75 percent survival rate of restoration plantings; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and self-sustaining trees at the end of five years. If these criteria are not met, the applicant shall re-plant and success shall again be assessed after five years.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-4: The County Public Works Department shall be responsible for ensuring that the specified reports are prepared prior to planned disturbance, and for ensuring implementation of Mitigation Measure R4.3-4e.

Level of Significance after Mitigation

Implementation of Mitigation Measures R4.3-4a, R4.3-4b, R4.3-4c, R4.3-4d, and R4.3-4e would reduce impacts to protected trees to less-than-significant levels.

Impact R4.3-5: Reclamation activities as well as post-reclamation development could result in substantial adverse effects on wetlands and waters of the U.S. under the jurisdiction of the Army Corps of Engineers, waters of the State under the jurisdiction of California Department of Fish and Game or the Regional Water Quality Control Board, and waters and land under Bay Conservation and Development Commission and State Lands Commission jurisdiction, and would be inconsistent with standards established for the Baylands Corridor in the Countywide Plan update (Significant).

As described above in the biological resources setting, a variety of wetlands and other waters of the U.S. under the regulatory jurisdiction of the USACE, CDFG, RWQCB, BCDC, and the State Lands Commission occur at or in the immediate vicinity of SRRQ. A number of proposed activities under ARP04 have the potential to impact jurisdictional waters at SRRQ. Impacts could include the following:

Shoreline Work and Tidal Open Water Area

Any work along the shoreline and within 100 feet inland of the mean high tide line would be subject to restrictions imposed by BCDC. Reclamation work, primarily in Phase 4, will involve constructing the future channel and connecting the Main Quarry Bowl to the Bay, demolition of buildings and extensive grading in the SE Quadrant within BCDC shoreline jurisdiction. Impacts would primarily consist of potential adverse effects on water quality from sedimentation or other debris during grading and dredging, as well as during construction of new structures and roads. ARP04's "Standards for Protecting Sensitive Habitats" include maintaining a 100 foot setback for post-reclamation commercial activity adjacent to the water in areas not currently part of the barge loading, long dock, and brickyard activities.

Tidal open water areas in and around SRRQ fall under the jurisdiction of BCDC, USACE, and the State Lands Commission. Construction activities that occur within open water areas could result in impacts to water quality from dredging or pile driving activities associated with modification of existing piers and installation of new in-water structures, such as the proposed marina and ferry terminal. Potential impacts include sedimentation in the Bay adjacent to the construction areas.

Diked Tidal Marshes

Under all four reclamation phases, potential impacts could include discharge of fill or eroded sediment into wetlands as well as potential discharge of toxic materials. The NW Quadrant salt marshes are currently cut off from tidal influence, as they likely have been for over 100 years, and have undergone conversion to brackish marsh in some areas, especially at their eastern end, as the only hydrologic input consists of fresh water. Currently, there are culverts that connect the marshes to each other, and a 36" gated culvert that connects the northwestern marsh ("Marsh 1" in Figure 3-2 in Chapter 3, Project Description) to the Bay. The gate is opened during low tide following large rain events in order to drain the marshes, but otherwise is kept closed. A float-controlled submersible pump is located adjacent to this culvert and automatically maintains the water level in the marshes to a level acceptable to the Marin/Sonoma Mosquito and Vector Control District, to allow for their amphibious vehicles to navigate the marshes for vector and mosquito abatement (Peer, 2007). It is likely that freshwater input has increased since the upstream development of the neighborhoods across Point San Pedro Road to the north. This conversion, while creating a mosaic of habitats and thus, on the one hand, creating a greater

habitat diversity, has, on the other hand, degraded sensitive potential habitat for special-status species dependent on salt marsh conditions, such as saltmarsh common yellowthroat, Point Reyes bird's beak, and mimic tryonia.

Under ARP82 the SRRQ marshes were to be preserved in a natural state and tidal circulation was to be restored by placing a bridge or culvert in the levee at the time of reclamation. A culvert and tide gates have been installed but tidal circulation has not yet been restored. These existing adverse conditions are carried forward under ARP04. The continued lack of tidal circulation attributable to ARP04 alone is considered to have a less than significant impact on marsh habitat. However, the contribution of ARP04 to cumulative impacts on marsh habitat is addressed below under Cumulative Impacts of the projects.

During the period of continued Quarry operations the marshes are to be protected through undefined "adequate setbacks" between reclamation activities and the marsh. What defines an adequate buffer depends on the purpose of the buffer, the quality of the habitat to be protected, surrounding land uses, and potential threats to the habitat being protected. The Marin Countywide Plan Update (2007) recommends a minimum 100 foot buffer be required for development in the Baylands Corridors. Given the long-standing and on-going degradation of the SRRQ marshes and the fact that they are relatively small and isolated from other similar habitat, it is unlikely that they will ever again support the full suite of salt-marsh species that they once may have, no matter what measures were taken to restore them, particularly as they are now bordered to the north and west by existing "upstream" development and further development has been proposed as a post-reclamation land use in both the NW and SW Quadrants. This is not, however, to say that these marshes would not be capable of providing relatively high value wildlife habitat were tidal circulation to be restored and were adequate buffers to be incorporated as part of reclamation phases and post-reclamation development design.

Freshwater Ponds, Marshes, Seasonal Wetlands, and Seeps

Reclamation activities in Phases 1 through 4, as well as post-reclamation development, could result in fill of potentially jurisdictional freshwater features at SRRQ. These include the freshwater seep in the NE quadrant, the freshwater marshes fringing the process ponds in the NW Quadrant, as well as several seasonal wetlands and ponds described above in the Setting under wetland habitats. Accidental discharge of toxic materials or sediment could also impact any one of these features during reclamation and construction activities.

Regulatory Requirements

Fill and excavation in areas considered to be jurisdictional waters would require permits and agreements from the appropriate regulatory agencies. Failure to proceed without permits or approvals would be in violation of these regulations. A verified wetland delineation would be required prior to the submittal of regulatory permit applications, therefore a wetland delineation would be conducted to establish jurisdictional boundaries for all potential wetlands and other waters and verified prior to initiation of Phase 1 reclamation activities and the project proponent would obtain all required permit approvals from the USACE, the RWQCB, BCDC, and any other agencies with permitting responsibilities for construction activities within jurisdictional waters. Permit approvals and certifications will likely include the following:

Section 404 / Section 10 Permits. Pursuant to Section 404 of the federal Clean Water Act, permit approval from the USACE shall be obtained for the placement of dredge or fill material in waters of the U.S., including, for example, the placement of rip-rap along shorelines, the building of new piers, the opening of the Main Quarry Bowl to Bay waters, and the placement of marina structures in the waters of the proposed marina. Dredging of the channel that would lead into the post-reclamation marina and any other construction below MHW elevation would require a Section 10 permit. Preparation of the Section 404 / Section 10 permit applications will require a Pre-construction Notification (PCN) and supporting documentation. A PCN outlines project activities, areas of impact, construction techniques, and methods for avoiding and reducing impacts to jurisdictional features.

Section 401 Water Quality Certification. Approval of Water Quality Certification (WQC) and/or Waste Discharge Requirements (WDRs) must be obtained from the RWQCB for work within jurisdictional waters. Preparation of the Section 401 Water Quality Certification permit applications will require a permit application and supporting materials including construction techniques, areas of impact, and project schedule.

BCDC Permit. Permit approval from BCDC would be required for placing solid material including pilings, boat docks, or other fill and/or dredging or other extraction of material from or into jurisdictional waters and within the 100-foot shoreline band inland from the mean high tide line along the length of the SRRQ shoreline. BCDC permit conditions typically include requirements to construct, guarantee, and maintain public access to the Bay, specified construction methods to assure safety or to protect water quality, and mitigation requirements to offset the adverse environmental impacts of the project.

Wetland permitting requirements and conditions will include compensation for temporary impacts to, and permanent loss of, waters of the U.S., including wetlands. Permitting requirements and conditions will also include the development of a *Wetland Compensation and Monitoring Plan*. Prior to the start of Reclamation Phase 1 or in coordination with permit applications the project proponent would prepare and submit to the regulatory agencies for approval, a mitigation and monitoring plan that outlines the anticipated compensatory obligations for temporary and permanent impacts to waters of the U.S., including wetlands, resulting from implementation of reclamation and post-reclamation activities. The Plan would include baseline information, anticipated habitat to be enhanced, performance and success criteria, monitoring and reporting requirements, and conceptual site specific plans to compensate for wetland losses resulting from the project. The *Wetland Compensation and Monitoring Plan* would include, but not be limited to, the following:

1. *Provision of onsite compensation through wetland creation or enhancement of existing jurisdictional features.* This could include: restoration of tidal marsh habitat, enhancement of roosting areas for shore birds and water birds, and enhancement of habitat diversity. Shoreline enhancements could include removal of rip-rap and restoration of shoreline vegetation. Wetland enhancement could include replacement of causeways across the NW Quadrant marshes with bridges to restore full tidal hydrology.

2. *Creation or enhancement of additional onsite wetlands or offsite compensation.* If permanent and temporary impacts to jurisdictional waters cannot be compensated for onsite through the restoration or enhancement of wetland features incorporated within proposed open space areas, the project sponsor shall negotiate additional compensatory mitigation for these losses with the applicable regulatory agencies. Potential options include the creation of additional wetland acreage onsite or the purchase of offsite mitigation.

Adverse impacts on jurisdictional waters resulting from project activities would be considered significant. As part of the Standards for Preserving Sensitive Habitats, ARP04 stipulates that “adequate setbacks” shall be instituted to protect the NW Quadrant marshes during reclamation but does not define them. ARP04 further stipulates that high quality stormwater runoff will be maintained to protect the marshes and that the outlet works of the marsh will be maintained in good order ~~to ensure tidal exchange (as previously noted, at this time there is no tidal exchange in the marshes)~~. ARP04 further states that the applicant will maintain water flow in existing swales and sloughs and would protect inlets from sedimentation as well as maintain a 10 foot setback between the head of jurisdictional other waters and reclamation activities. While these measures offer some protection, they are not adequate to fully mitigate potential impacts to jurisdictional waters at SRRQ.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-5a: ARP04 contains standards for setbacks from marsh areas. As stated in Chapter 3, Project Description, the saltwater and brackish marsh areas in the NW Quadrant would be protected by maintaining a setback from the edge of the existing marsh, maintaining high quality stormwater runoff, and keeping the outlet works of the marsh in good working order ~~to ensure tidal exchange~~. ARP04 further states that stormwater quality would be monitored, and that the setback would align with the edge of current operations, including the edge of existing pavement and/or storage areas in the McNear’s Brickyard storage area. As this component of ARP04 does not comply with the setback requirements for the Baylands Corridor contained in the Countywide Plan Update, Mitigation Measure R4.3-5b is necessary to further mitigate this impact.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-5b: All jurisdictional wetland areas to be avoided shall be protected by setbacks throughout site reclamation and post-reclamation development consistent with the Baylands Corridor designation of the site in the Countywide Plan Update:

- Setbacks for the NW Quadrant marshes shall be consistent with the requirements of the Baylands Corridor designation for the site. During reclamation activities, no temporary or permanent reclamation stockpiles, berms, or other features shall be placed within 100 feet of the NW Quadrant marshes. Buffers shall be included as part of post-reclamation development design in the vicinity of the NW Quadrant marshes and shall be a minimum of 100 feet in width.
- Setbacks for seeps and seasonal wetlands shall be a minimum of 50 feet.
- Areas that are avoided and provided with setbacks will be further protected by Best Management Practices (BMPs), as described in Mitigation Measure R4.3-5d below.

Such measures include the installation of silt fencing, straw wattles or other appropriate erosion and sediment control methods or devices along roads and at the 100 foot setback limits. Such BMPs shall also be employed if and when reclamation grading and post-reclamation development requires work within the setbacks as described above, between the feature and the activity.

Mitigation Measure R4.3-5c: All necessary jurisdictional wetland permits and approvals of appropriate regulatory agencies shall be obtained prior to each relevant phase of reclamation.

Mitigation Measure R4.3-5d: The applicant shall conduct reclamation activities in a manner that avoids erosion and sedimentation of wetland areas, through implementation of standard BMPs to maintain water quality and control erosion and sedimentation during construction as required by compliance with the General National Pollution Discharge Elimination System (NPDES) Permit for Construction Activities and as established by mitigation measures set forth in Section 4.5, Hydrology and Water Quality.

Mitigation measures would include, but would not be limited to, installing silt fencing between jurisdictional waters and project related activities, locating fueling stations away from potentially jurisdictional features, and otherwise isolating construction work areas from any identified jurisdictional features. In addition, BMPs identified in the *Long-term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region* (LTMS) (Corps, 2001) shall be implemented to prevent degradation of water quality resulting from dredging activities within open waters. These BMPs include: silt fencing and gunderbooms or other appropriate methods for keeping dredged materials from leaving the project site.

Mitigation Measure R4.3-5e: The applicant shall revise the ARP to include as a standard for guiding development of the final Development Plan that post-reclamation residential, commercial, and mixed use development, except as otherwise permitted by BCDC, shall not occur within the 100 foot shoreline band subject to BCDC jurisdiction.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-5a: The Marin County Public Works Department shall be responsible for ensuring that setbacks are established and maintained, and that BMPs and other measures to avoid construction-related impacts on wetlands are implemented during reclamation activities.

Draft Mitigation Monitoring Measure R4.3-5b: Conditions of additional permits needed for work within jurisdictional waters will be monitored by the relevant permitting agencies, including the USACE, RWQCB, and BCDC.

Draft Mitigation Monitoring Measure R4.3-5c: The Marin County Department of Public Works shall be responsible for reviewing revisions to ARP04 prior to its adoption.

Level of Significance after Mitigation

The combination of Mitigation Measures R4.3-5a-e would reduce this impact to less than significant.

Impact R4.3-6: Reclamation activities and post-reclamation development activities such as dredging, pile driving, jetty construction, and other “in-water” construction activities would result in temporary disturbances to aquatic biological resources and Essential Fish Habitat (EFH) (Significant).

Short-term impacts on aquatic biological resources would occur from dredging, pile driving, jetty construction, placement of revetments associated with proposed project components such as harbor channel and ferry landing construction. Impacts that are typically associated with these activities include temporary water quality degradation, increased turbidity due to in-water construction and dredging, harmful sound pressure levels associated with pile-driving, short-term loss of benthic habitat and associated benthos and floating aquatic plants, and short-term loss and disruption of potential fishery habitat.

Potential Impacts of Dredging on Benthos, Fisheries and other Aquatic Biota

The proposed project would introduce tidal flows into the harbor basin, which would transport sediment into the basin and the entrance channel. Additional sedimentation may occur due to slope failures and slumping of soil from the slopes adjacent to the channel. The entrance channel area, particularly beyond the jetties, may experience sedimentation rates of more than one foot per year, especially following initial construction (Appendix I). The accumulation of sediment would require periodic dredging of the channel.

Dredging in San Francisco Bay has long been identified as a potential source of impact to fisheries resources and is addressed by the USACE Long-term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) (USACE, 2001). The future dredging of the harbor channel will result in the total loss of all benthos for one or more years, depending on the time of year dredging occurs. Dredging prior to spring recruitment will result in faster recolonization while dredging after spring recruitment would result in a delayed and extended recolonization period. Dredging will also result in the loss of any submerged or floating biota. Loss of the benthos will also result in indirect effects on fish and aquatic birds using the area for foraging while the infaunal community is reestablishing itself. The direct entrainment of small fish, such as the Delta and longfin smelt, juvenile Sacramento splittail, juvenile salmonids, and other Delta fish species during dredging can occur, depending on the method of dredging employed. Any form of suction dredging has a higher potential for entrainment of fish species whereas the use of a clam shell type dredge has a lower probability of direct impact since the pressure wave created by the clam shell moving through the water can be expected to result in increased detection and avoidance by fish.

Potential Impacts of Pile-Driving Activities on Fisheries

Pile-driving activities create increased underwater sound pressure levels. Sound pressure levels in excess of 180 decibels may injure or kill fish. Salmonid species, including Chinook salmon and steelhead, may potentially be present in the project area or vicinity during the period of November through May. Outside of this period, salmonids are less likely to occur in the project vicinity. Delta and longfin smelt and Sacramento splittail may be present at any time during the year, although likely in low numbers. Spawning adult green sturgeons migrate through the Delta between February and July, and juveniles can be found in the Delta throughout the year. These

species may be exposed to excessive sound pressure levels during pile-driving activities associated with the construction of the proposed project.

Open water construction activities will require obtaining necessary permits from agencies such as the USACE, which in turn will require consultation with the USFWS and NMFS. Typically, permit applicants will be required to implement the guidelines of the USACE's LTMS. For species for which construction work windows have been established by the LTMS (Chinook salmon, steelhead, longfin smelt), project construction will occur during those periods. For species for which in-water construction is restricted throughout the year (Delta smelt, Sacramento splittail) formal Section 7 consultation will be required.

The LTMS identifies specific work windows for dredging projects to protect salmonids and longfin smelt for various regions of the San Francisco Bay estuary. The LTMS was developed during formal consultation between NOAA Fisheries, USFWS, and CDFG to address impacts to sensitive fisheries and designated critical habitats under their respective jurisdictions and standardize mitigation for dredging projects. The Biological Opinion resulting from the LTMS presents specific restrictions on the timing and design of dredging and disposal projects. As the LTMS states, if the dredging project can be accomplished during the identified work windows, the project is authorized for incidental take under Federal Endangered Species Act of 1973, as amended. The LTMS serves as the federal and state pathway for determining potential impacts of dredging and dredge disposal projects on fish species, with timing of construction as the single significance criterion.

As identified in the LTMS, restricting dredging and other in-water construction activities to specific work windows would avoid direct and indirect impacts to these species. The work window for Chinook salmon and steelhead extends from June 1 through November 30 while the window for longfin smelt extends from September 1 through November 30. As the longfin smelt work window is more restrictive, in-water activities such as dredging and pile-driving would have to occur during the period of September 1 through November 30.

However, the LTMS does not provide acceptable work windows for Delta smelt and Sacramento splittail, indicating that Section 7 consultation (Delta smelt) and conferencing (Sacramento splittail) is required. Typical consultation and permit requirements would include, but not necessarily be limited to:

- Clamshell dredging shall be required whenever practicable in areas within 250 feet of a shoreline or in depths less than 20 feet.
- If hydraulic dredging in depths less than 20 feet, dredge head must be maintained at or below substrate surface. Head may not be raised more than 3 feet off bottom for flushing; shut off pump when raising head more than 3 feet off bottom (e.g., at end of dredging).
- If project will cause unavoidable direct or indirect effects to submerged or emergent aquatic vegetation, compensatory mitigation at 3:1 ratio is required for lost function and values. Other proposed ratios require consultation with USFWS and CDFG.

- Best Management Practices to reduce turbidity (including silt curtains or other physical or operational measures) shall be required for these projects.
- Restrictions apply within the identified critical period, and within 250 feet of emergent vegetation. USFWS and CDFG must be contacted in these circumstances.

The LTMS was developed prior to the listing of green sturgeon as a threatened species and therefore the species is not addressed in the plan. Furthermore, there currently is no FESA Section 9 take prohibition for green sturgeon, but such prohibition is likely to be in place by the time dredging and pile-driving activities undergo project-level environmental review, in which case an effects analysis will need to be done as part of the jeopardy analysis required under FESA Section 7(a)(2).

Neither does the LTMS provide work windows for Pacific herring in the San Pablo Bay region, although the species is protected under the program in other parts of San Francisco Bay (e.g., south-central San Francisco Bay) (USACE, 2001).

Avoiding pile-driving activities between November 1 and June 1 (i.e., late fall, winter, and spring), or assuring that pile-driving would result in Sound Exposure Levels (SEL) below 187 decibels (dB) and peak Sound Pressure Levels (SPL) below 208 dB at 10 meters (Popper et al., 2006), would reduce the potential impact of sound pressure levels on fish species to less than significant. Any pile-driving work occurring outside of these work windows would be conducted in accordance with NMFS directives and USACE permits to reduce potential impacts on fish species.

Although the proposed project would require dredging, pile driving, and other “in-water” construction activities, the regulatory requirements for the protection of aquatic species in San Pablo Bay are adequately stringent to ensure that impacts associated with these activities would be less than significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-6a: Prior to open-water construction activities, the applicant shall obtain the necessary permits from the USACE and other regulatory agencies. Open-water construction will not begin prior to obtaining necessary permits.

Mitigation Measure R4.3-6b: All open-water construction activities shall adhere to the guidelines of the then-current version of the LTMS.

Mitigation Measure R4.3-6c: To minimize wetland disturbance the construction of the connecting channel from the Main Quarry Bowl to the Bay and removal or installation of rip-rap along the Bay shoreline will either operate from dry land or from water-based equipment such as barges, scows, derrick barges, and tugs.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measures R4.3-6: USACE and other permit conditions are likely to include the relevant guidelines of the LTMS; it is anticipated that adherence to these conditions will be monitored by the USACE or other agencies, such as NMFS, designated in the permits.

Level of Significance after Mitigation

The implementation of Mitigation Measures R4.3-6a, b, and c can be expected to reduce this impact to a less than significant level.

Impact R4.3-7: Poor water quality in the deep water within the flooded Main Quarry Bowl could occur due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. This condition could result in impacts to special-status aquatic species (Significant).

As discussed under *Hydrology and Water Quality* Impacts 4.5-4 and 4.5-5 of this DEIR, the flooded Main Quarry Bowl would be approximately 400 feet deep, making it the deepest body of water in San Francisco Bay and San Pablo Bay. Water enclosed in a deep, small embayment does not circulate at the same rates as waters in the shallower San Francisco and San Pablo Bays. Circulation is crucial process replenishing dissolved oxygen in the water, distributing nutrients, and flushing pollutants. Analyses have shown that the surface water of the proposed harbor to an approximate depth of 30 feet would adequately circulate and surface water degradation would not occur in this surface layer (Moffatt & Nichol, 2004; CHE, 2007 – Appendix I). However, the deep water in the basin, 300 to 400 feet deep, may have a flushing time on the order of months (Moffatt & Nichol, 2004; CHE, 2007). The long flushing times could cause stagnation and reduced oxygen with depth, which would adversely impact aquatic species. Furthermore, vertical mixing of the low oxygen, stagnant water with water nearer to the surface could degrade shallower, higher quality water. In addition to stagnation and reduced dissolved oxygen in the deep water, the harbor basin would likely become stratified due to differences in temperature and salinity (density) between the shallow and deep water, which would contribute to decreased mixing. There may be some vertical exchange over certain water depths, but this would likely be small compared to the horizontal exchange in the surface due to tides. The water quality in the deep water would be impacted due to stagnation, stratification, and a potential build-up of pollutants.

In addition, it is likely that mercury-laden sediments will be brought into the flooded basin with the tide, and deposited on the bottom where, in the low dissolved oxygen environment, they will be subject to methylation. Methylated mercury may enter the aquatic food web, for example by being taken up by algae, contributing to potential impacts to fish, piscivorous birds, and humans through bioaccumulation of methylmercury. This aspect of this impact is also discussed in Section 4.5, Hydrology and Water Quality.

Low dissolved oxygen concentration and high pollutant concentrations in the deep water layers of the harbor would likely have deleterious effects on aquatic life. However, aquatic organisms

residing in the San Francisco/San Pablo Bay region are adapted to relatively shallow waters and are unlikely to establish permanent habitats in the extreme depths of the proposed harbor. Nevertheless, water quality-related impacts to aquatic life could potentially occur if organisms enter the deep portion of the harbor, either intentionally or inadvertently, or if hydrologic conditions result in the release or upwelling of degraded water to the surface layers, or if methylmercury enters the aquatic food web. This impact is significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-7: ~~Implement Mitigation Measure R4.5-6 in Section 4.5, Hydrology and Water Quality. As described in Mitigation Measure 4.5-6, no feasible mitigation measure is available to avoid or minimize this impact. Therefore, the impact is considered significant and unavoidable. See also Chapter 6, Alternatives.~~

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-7: ~~The Marin County Department of Public Works will be responsible for reviewing the report specified in Mitigation Measure R4.5-6. Since no feasible mitigation measures are available to reduce the significance of this impact, no mitigation monitoring measures are specified.~~

Significance after Mitigation

~~Significant and Unavoidable. Since Impact R4.3-7 would occur due to the water quality problems identified in Impact R4.5-6, mitigating Impact R4.5-6 to less than significant through implementation of Mitigation Measure R4.5-6 would also reduce this impact to less than significant.~~

Impact R4.3-8: Reclamation activities conducted in the vicinity of the process water ponds in the NW and SW Quadrants have the potential to adversely impact California red-legged frog (Significant).

Reclamation activities as well as post-reclamation development occurring in the vicinity of the process water ponds in the NW and SW Quadrants have the potential to impact California red-legged frog (CRLF), should they be present at SRRQ. ARP04 includes surveys for CRLF in its “Standards for Preserving Sensitive Habitat Areas,” to be conducted prior to filing for grading permits for each reclamation phase, as well as undefined setbacks to be established in the site’s Development Plan. Mitigation Measure R4.3-8b details the CRLF survey procedure and setbacks that would be required by USFWS if frogs were found to be present or assumed to be present during reclamation as well as development.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-8a: ARP04 includes surveys for CRLF in its “Standards for Preserving Sensitive Habitat Areas,” to be conducted prior to filing for grading permits for each reclamation phase, as well as undefined setbacks to be established in the site’s Development Plan.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-8b: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW and

SW Quadrants in a manner that avoids take of CRLF through surveys to determine whether the species is present, and, if so, to reduce the risk of take of individuals of the species, as specified below. Specifically, the following measures shall be implemented:

- The project proponent shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines prior to filing for grading permits for Reclamation Phase 1. The habitat assessment shall be submitted to USFWS for review. If, following the review of the

habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process water ponds in the NW and SW Quadrants) on the project site.

- If no CRLF are found during the habitat assessment and/or protocol level surveys associated with Phase 1 reclamation activities then the project proponent shall consult with USFWS as to the necessity of conducting further assessments or surveys for Phases 2 through 4 and/or for post-reclamation development.
- If, as a result of the habitat assessment and/or protocol level surveys, CRLF are found on the project site, the project applicant shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the federal Endangered Species Act). Specific measures to protect CRLF shall be determined in consultation with USFWS and may include, but are not limited to, the following measures, which are derived from the USFWS Programmatic Biological Opinion (PBO) for impacts to CRLF. The PBO summarizes typical project effects and provides generic preventive measures designed to substantially reduce the risk of incidental “take” of CRLF within the project area:
 - The name and credentials of a biologist qualified to act as construction monitor shall be submitted to USFWS for approval at least 15 days prior to commencement of work.
 - A qualified biologist shall conduct pre-construction surveys within aquatic habitat by two weeks prior to the onset of construction activities. Surveys shall be completed for all life cycle stages of CRLF (e.g., egg masses, tadpole, juveniles, and adults) that may occur within the project area. If adult CRLF, tadpoles or eggs are found within the construction disturbance zone, the approved biologist shall contact USFWS to determine if moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved biologist shall be allowed sufficient time to move them from the construction sites before work activities begin. If no frogs are detected during these surveys, construction-related activities may proceed without further requirements for the protection of individuals, although habitat protection measures (i.e., avoidance of intermittent drainages and riparian habitat) shall still be observed.
 - Exclusionary fencing, such as silt fences, shall be installed around the process ponds and around all construction areas that are within 100 feet of or adjacent to potential CRLF habitat. Once fencing is in place, it shall be maintained by the proponent until completion of construction within or adjacent to the enclosure.
 - Prior to commencement of any earthmoving activities, the monitoring biologist shall train all construction personnel and work crews on the sensitivity and identification of the CRLF and the penalties for the “take” of this species. In addition, visual materials shall be provided to assist in identifying the species.

Training sessions will be repeated for all new employees before they access the project site and periodically throughout project construction.

- The monitoring biologist will demarcate construction avoidance areas in the field and monitor construction activities within 300 feet of aquatic habitat for CRLF. The demarcation shall remain on-site until all initial vegetation clearing and habitat disturbance is completed.
- All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from any riparian habitat or water.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-8a: Surveys for CRLF in its “Standards for Preserving Sensitive Habitat Areas,” shall be conducted prior to filing for grading permits for each reclamation phase.

Draft Mitigation Monitoring Measures R4.3-8b: The Department of Public Works shall verify that a CRLF habitat assessment and protocol-level surveys, if required, have been completed and reviewed by USFWS prior to issuance of the grading permits.

Level of Significance after Mitigation

Mitigation Measures R4.3-8a and R4.3-8b will mitigate this impact to a less-than-significant level.

Impact R4.3-9: Reclamation activities and post-reclamation development activities conducted in the vicinity of the process water ponds in the NW Quadrant have the potential to impact northwestern pond turtles (Significant).

Reclamation activities as well as post-reclamation development occurring in the vicinity of the process water ponds in the NW Quadrant have the potential to adversely impact northwestern pond turtle (WPT), should they be present. As noted above in Impact R4.3-6 ARP04 includes surveys for CRLF in its Standards for Preserving Sensitive Habitat Areas, to be conducted prior to filing for grading permits for each reclamation phase, as well as setbacks to be established in the site’s Development Plan. However, no mention of WPT is made in ARP04, therefore, any potential impacts to this species remain unmitigated.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-9: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW Quadrant in a manner that avoids take of northwestern pond turtle through surveys to determine whether the species is present, and, if so, to limit reclamation and post-reclamation development activities as specified below. Specifically, prior to filing for Phase 1 reclamation grading permits, a qualified biologist who is permitted by CDFG to move turtles and their nests

shall perform northwestern pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant. Surveys and subsequent actions shall include the following:

- Surveys shall be conducted for nests as well as individuals.
- If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas.
- No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests.
- If a nest is located within the process pond area and may be impacted by reclamation activities, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG.
- A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG.
- If no turtles are found during surveys associated with Phase 1 reclamation activities the project proponent shall consult with CDFG regarding the need for further future surveys.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measures R4.3-9: The Department of Public Works shall verify the submittal of a northwestern pond turtle survey report, as well as the implementation of protective measures, if necessary, prior to issuance of Phase 1 grading permits.

Level of Significance after Mitigation

Mitigation Measure R4.3-9 would ensure that the impacts to northwestern pond turtle are reduced to less than significant.

Impact R4.3-10: Reclamation activities resulting in the destruction of abandoned buildings or tree removal within the San Rafael Rock Quarry could adversely impact special status bat species (Significant).

Insects associated with brackish marsh, tidal flats, and open grasslands on the project site provide a good potential food source for bats. Bats are known to use the McNear's Brickyard kiln and chimneys for roosting purposes and may use these structures as nurseries or winter hibernacula as well. A number of special- status bats, including Pacific western big-eared bat, long-eared myotis,

fringed myotis, and Yuma myotis could also potentially roost and breed in eucalyptus or oak trees or other vacant buildings within SRRQ.

Tree removal and building demolition associated with reclamation work could result in the direct mortality of special-status bats if present. Such activities could also result in disturbance of maternity roosts or winter hibernacula.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-10: The applicant shall conduct reclamation activities involving tree removal and building demolition in a manner that avoids disturbance or mortality of bats, through surveys to determine whether bats are present, and, if so, to limit reclamation activities as specified below. Specifically, the applicant shall take the following measures to avoid direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula:

- A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of all potential bat habitat within 500 feet of reclamation activities prior to initiation of such activities. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night).
- Removal of trees or demolition of buildings showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal or building demolition.
- A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Bat roosts initiated during construction are presumed to be unaffected, and no buffer is necessary. However, “take” of individuals, including harming, harassing, or killing, will be prohibited.
- If pre-construction surveys indicate that roosts are inactive or potential habitat is unoccupied during the reclamation or construction period, no further mitigation is required. Trees and buildings that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished.
- If known bat roosting habitat is to be destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed at least two weeks prior to such disturbance in an undisturbed area of the

property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measures R4.3-10: The Department of Public Works shall verify that bat survey reports have been submitted prior to tree removal and shall not issue a grading permit, if required, prior to submittal of the bat survey report.

Level of Significance after Mitigation

Implementation of Mitigation Measure R4.3-10 will reduce impacts to special status bats to less than significant levels.

Impact R4.3-11: Reclamation activities and post-reclamation development could adversely affect special-status nesting raptors and other nesting birds (Significant).

Although the high ambient levels of noise and activity at SRRQ likely preclude nesting activities for many special-status birds, potential nesting habitat for several special-status raptors occurs on or near SRRQ. Nesting habitat for northern harrier occurs in the marshes in the NW Quadrant and red-tailed hawks, red-shouldered hawks, and great-horned owls could potentially utilize eucalyptus on South Hill, along the northern border of the property in the NE Quadrant, and in the SW Quadrant for nesting. All raptors, their nests, and eggs are protected under CDFG Code 3503.5. Other special-status bird species potentially breeding on the project site include San Pablo song sparrow and saltmarsh common yellowthroat, which may use the marshes in the NW Quadrant for nesting purposes. In addition, CDFG Code 3503 protects the needless destruction of nests or eggs of most bird species. Common birds that could be found nesting at SRRQ in grasslands, ruderal habitat, on buildings, and in the marshes include killdeer, mourning dove, black phoebe, red-winged blackbird, rock dove, and others.

Increased noise and activity resulting from reclamation activities or post-reclamation construction, were it to exceed ambient levels, could cause nest abandonment and death of young or loss of reproductive potential at active nests located at SRRQ. In addition, grading and removal of trees or other vegetation could result in direct losses of nests, eggs, or nestlings. Such impacts to special-status birds would be considered significant. In order to mitigate such anticipated impacts the ARP04 project description includes nesting raptor surveys as part of the “Standards for Preserving Sensitive Habitat Areas.” However, surveys for special-status passerine nesting birds are not included and, therefore, this potential impact is not fully mitigated. Mitigation Measure R4.3-11b incorporates and details the nesting raptor surveys that will occur as part of the project and also includes details for passerine surveys.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3.11a: ARP04 includes nesting raptor surveys as part of the “Standards for Preserving Sensitive Habitat Areas.”

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-11b: The applicant shall conduct reclamation and post-reclamation development activities in a manner that avoids direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success. Specifically:

- During the breeding bird season (~~January~~ ~~February~~ 1 through August 31) a qualified biologist will survey activity sites for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal.
- If reclamation or construction activities occur only during the non-breeding season between September 1 and ~~January~~ December 31, no surveys will be required.
- Results of the surveys will be forwarded to CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis. Avoidance procedures shall be reviewed and approved by CDFG. Depending on the species involved, these may include construction buffer areas (up to several hundred feet in the case of raptors) or seasonal restriction of activities.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measures R4.3-11: The Department of Public Works shall verify the submittal of breeding bird surveys and, if a grading permit is required for reclamation-related activities, shall not issue such permit prior to submittal and review of the breeding bird survey report.

Level of Significance after Mitigation

Implementation of Mitigation Measures R4.3-11a and R4.3-11b would reduce any direct or indirect effects on special-status bird species to less than significant.

Impact R4.3-12: Post-reclamation residential and commercial development adjacent to marsh habitat could result in long-term adverse impacts to special-status species inhabiting the adjacent marsh habitat through increases in the levels of human noise and activity, lighting, as well as the introduction of domestic animals (Significant).

SRRQ marsh habitat in the NW Quadrant may support a variety of special status wildlife. Currently the marshes are subject to human-related noise and disturbance from quarry and brickyard operations. Proposed post-reclamation development would occur in direct proximity to the marshes in both the NW and NE Quadrants, replacing what are currently ruderal and barren habitat or light industrial land uses. The additional and more proximate residential development, planned as part of the post-reclamation use of the site, would result in increased human noise and activity in areas adjacent to the marsh, could introduce lighting effects, and could provide an additional source of domestic animal disturbance of wildlife. Studies have shown that free roaming cats often associated with residential units have a significant impact on native wildlife species. For example, a study conducted on East Bay Regional Park lands showed 85 percent of the total number of deer mice and harvest mice trapped were found in an area with no cats as opposed to 15 percent of the total trapped in an area with cats (Hawkins et al., 2004). Potential

impacts to nesting birds and other wildlife that inhabit the SRRQ marshes include harassment, disturbance during foraging, breeding, and nesting, and potential mortality of adults and young.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.3-12a: ARP04 proposes to establish buffer areas around the marshes.

Mitigation Measures Identified in this Report

Mitigation Measure R4.3-12b: The applicant shall submit revisions to ARP04 that include a standard for development of the final Development Plan (to be submitted three years prior to cessation of mining activities) that requires the applicant to conduct post-reclamation development activities in a manner that avoids harassment, disturbance, and mortality of nesting birds and other wildlife that inhabit the SRRQ marshes. The standard will include development of a Marsh Wildlife and Habitat Protection Plan, to be prepared as a part of the Development Plan, and subject to review and approval by the Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. Components of the plan will include, but not be limited to, the following:

- In accordance with the policies set forth in the Marin Countywide Plan (2007) the project development footprint will maintain a set back of at least 100 feet from marsh habitat on the project site.
- Cyclone fencing with vinyl slats for screening shall be installed at the setback distance between the marshes and all residential or commercial development. Appropriate native vegetation will be planted both inside and outside of the fence to provide further screening. The fence will be designed specifically to provide a barrier to exclude cats, dogs, and other household pets from marsh areas and will also provide a visual screen between marsh wildlife and human activity.
- To minimize the potentially-adverse effect of night lighting on the adjacent salt marsh habitat the following will be utilized: street lighting only at intersections, low-intensity street lamps and low elevation lighting poles, and internal silvering of the globe or external opaque reflectors to direct light away from marsh habitat. In addition, private sources of illumination around homes shall also be directed and/or shaded to minimize glare into the marsh.
- An education program for residents will be developed including posted interpretive signs and informational materials regarding the sensitivity of the marsh habitat, the dangers of unleashed domestic animals in this area, and discouragement of the practice of feeding feral cats.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.3-12a: The Marin County Department of Public Works will be responsible for reviewing the revised ARP for completeness prior to project approval.

Draft Mitigation Monitoring Measure R4.3-12b: The Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and

Wildlife Service shall be jointly responsible for review and approval of the Marsh Wildlife and Habitat Protection Plan as part of review and approval of the final Development Plan.

Level of Significance after Mitigation

Mitigation Measures R4.3-12a and R4.3-12b together will mitigate this impact to less than significant.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.3-13: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect California red-legged frogs should they occur at the Quarry site (Significant).

The two process ponds in the NW and SW Quadrants (shown as “Freshwater marsh” and “Open water” in Figure 4.3-1) provide aquatic habitat and freshwater emergent marsh that may support California red-legged frog (CRLF). ~~Other areas mapped as open water on Figure 4.3-1 do not support emergent vegetation and are therefore not considered suitable habitat for CRLF.~~ ARP04 acknowledges the potential presence of CRLF in the ponds and states that the ponds will continue to be used for process water as required by Quarry operations. ~~Currently none of the process ponds are used for Quarry operations.~~ Water is pumped from the large pond in the southeast corner of the NW Quadrant to be used in McNear’s Brickyard operations. Although the pumps are screened, pumping of water out of the ponds could result in entrainment and mortality of CRLF larvae, tadpoles, and adult frogs should the screens not be maintained on a regular basis and fail. The ponds are fed by direct precipitation and runoff. Although the Quarry has BMPs in place, such as hay wattles and silt screens, to protect the quality of water entering the ponds and the marshes, runoff could still result in the introduction of sediment or toxins that could have adverse effects on all life-stages of CRLF. Existing Quarry and brickyard operations do not entail the removal of cattails, tules, and other freshwater marsh vegetation occurring along the margins as part of pond maintenance. However, such actions might be necessary during future operations in order to maintain water capacity, which could result in direct mortality of frogs and reduce available cover, increasing their chances of predation. Since these actions have the potential to result in significant adverse impacts on CRLF, Mitigation Measure P4.3-13 is specified below to reduce those impacts to less than significant levels.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.3-13: The applicant shall conduct Quarry operations in a manner that avoids take of California red-legged frog. This mitigation measure shall be implemented through the following:

- As a condition of approval of the AQP by the County, and prior to any site disturbing activity within ~~50~~300 feet of the ponds or fresh water marsh, the applicant shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish

and Wildlife Service (USFWS) guidelines. The habitat assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process ponds in the NW and SW Quadrants) on the project site. The project proponent shall provide the County with the results of the habitat assessment, USFWS review, and protocol-level surveys, if required, prior to any site disturbing activity within ~~50~~300 feet of the subject areas.

- If no CRLF are found during the habitat assessment or protocol level surveys, then with the concurrence of USFWS, no further mitigation shall be required.
- If, as a result of the habitat assessment or protocol level surveys, CRLF are found to inhabit the process ponds in the NW and/or SW Quadrants, the project proponent shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the Federal Endangered Species Act). Consultation will consider whether or not continued use of the process ponds in the NW and/or SW Quadrants is possible without take of CRLF and whether or not a take permit would be required for continued use.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.3-13: The Department of Public Works shall verify that a CRLF habitat assessment and protocol-level surveys, if required, have been completed and reviewed by USFWS prior to site disturbing activity within ~~50~~ 300 feet of the ~~two~~ three process water ponds or the freshwater marsh.

Level of Significance after Mitigation

Implementation of Mitigation Measure P4.3-13 will mitigate potential impacts on CRLF to less than significant levels.

Impact P4.3-14: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect northwestern pond turtle should they occur at the Quarry site (Significant).

The process ponds in the NW Quadrant also provide potential habitat for northwestern pond turtle. Other areas mapped as open water on Figure 4.3-1 do not support emergent vegetation and are therefore not considered suitable habitat for northwestern pond turtle. Similar to the potential impacts described above for CRLF, existing and ongoing Quarry operations relating to the use of process water from these ponds have the potential for adverse impacts on this species. Therefore, Mitigation Measure P4.3-14 is proposed below to reduce those impacts to less than significant levels.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.3-14: The applicant shall conduct Quarry operations in a manner that avoids disturbance to or mortality of northwestern pond turtle. This mitigation measure shall be implemented through the following: As a condition of approval for the AQP by the County and prior to any site disturbing activity within ~~50~~300 feet of the NW Quadrant process water ponds, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform western pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant.

- Surveys shall be conducted for nests as well as individuals.
- If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas.
- No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests.
- If a nest is located within the process pond area and may be impacted by Quarry associated operations, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG.
- A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.3-14: The Department of Public Works shall verify the submittal of a WPT survey report, as well as the implementation of protective measures, if necessary, have been completed and reviewed by USFWS prior to site disturbing activity within ~~50~~300 feet of the two process water ponds.

Level of Significance after Mitigation

Mitigation Measure P4.3-14 will mitigate potential impacts on northwestern pond turtle to less than significant levels.

Impact P4.3-15: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge (Significant).

A number of special-status birds have the potential to occur and possibly breed in the marshes and woodlands at SRRQ. Saltmarsh common yellowthroat and San Pablo Bay song sparrow, as

well as other passerine birds, may breed in the marshes and raptors, including red-tailed hawk and great-horned owl, may use large eucalyptus on South Hill and along the perimeter of the NE Quadrant for nesting. Smaller passerine species such as Bewick's wren and wren-tit were observed during reconnaissance field surveys of the site and may breed in the oak woodlands and scrub located at SRRQ. ARP04 stipulates that surveys for raptor nests shall be conducted prior to removal of trees on South Hill for quarrying; however no surveys are required for other special-status birds that might be nesting in trees or other vegetation (shrubs, scrub, grasslands) slated for removal in relation to Quarry operations. Vegetation removal that resulted in take of the eggs, nests, or nestlings of special-status birds would constitute a significant impact. However, this potential impact could be mitigated to less than significant levels through implementation of Mitigation Measure P4.3-15 below.

The Marin Islands National Wildlife Refuge is situated in the Bay waters approximately 1.5 miles south of SRRQ. Scoping comments for this EIR suggested that noise and barge traffic associated with extended quarrying operations may have adverse impacts on the heron and egret rookeries on West Marin Island. However, recent studies of the reproductive success of birds using the Refuge have not implicated noise from the existing Quarry operations as an influencing factor (Kelly et al., 2006). The distance between the Quarry and the Refuge is itself enough to ensure that noise from most Quarry operations would have a negligible effect on the rookeries since noise attenuates fairly rapidly over distance⁸. In addition, prevailing winds in the area are from the south and southwest, which would further serve to reduce most noise originating from the Quarry that might be heard at the Refuge (noise originating from an upwind source can be attenuated by up to 20 dBA (California Dept. of Transportation, 1998)). Therefore, noise resulting from continued quarrying and reclamation activities is expected to have a negligible impact on birds using the Refuge because most noise levels reaching the Refuge from the Quarry are not expected to be significantly higher than existing ambient levels, which likely range from 35 to 50 dBA or more during peak traffic times on the Richmond-San Rafael bridge, which is approximately 1.5 miles downwind of the refuge⁹. Barges transporting materials from the Quarry do not operate in the vicinity of the Refuge, therefore there would be no impacts from barge traffic.

Previous analyses conducted in conjunction with Quarry permitting have not considered the potential indirect effects of disturbance from noise from quarrying, including blasting and day-to-day Quarry operations, or ongoing truck traffic through the marshes, on the reproductive success of special status birds in the vicinity of the Quarry. Much of the existing remaining habitat at SRRQ has been degraded through long-standing and ongoing industrial uses. It is likely that a number of disturbance-sensitive species simply no longer occur in the area due to the length of time the Quarry and McNear's Brickyard have been in operation. It is equally likely that disturbance-tolerant species or individuals nest successfully at SRRQ, despite the relatively high levels of disturbance. It is also likely that, since birds are highly mobile and the level of quarry

⁸ Noise from a stationary source attenuates at a rate of 6dBA for every doubling of distance (California Dept. of Transportation, 1998). For example, a noise measuring 89 dBA at 50 feet from the source would attenuate to 53 dBA at 3200 feet and 47 dBA at 6400 feet.

⁹ Noise from the bridge originates downwind of the Refuge, which can reduce the attenuation over distance by up to 20 dBA.

activities is expected to vary from weekdays to weekends as well as between periods of greater and lesser demand for quarry products, disturbance-sensitive individuals would choose to nest at the site during periods of lesser activity. Such birds using, for example, the eucalyptus in the NE Quadrant or remaining vegetation on South Hill could be disturbed by increases in noise from quarrying activities and blasting to an extent that would cause reproductive failure. Variability in truck traffic in and out of the Quarry could disrupt birds attempting to use the marshes for breeding purposes and result in nest failure or abandonment and mortality of young.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.3-15: The applicant shall conduct Quarry operations in a manner that avoids direct losses of nests, eggs, and nestlings and potential indirect impacts to avian breeding success resulting from vegetation removal as well as variability in quarrying activity levels on South Hill. This mitigation measure will be implemented through the following:

- During the breeding bird season (~~February~~ January 1 through August 31) a qualified biologist will survey sites for nesting raptors and passerine birds not more than 14 days prior to any vegetation removal (including trees, shrubs, scrub, and grassland vegetation). In addition, vegetation on South Hill will be surveyed if quarrying activities on South Hill cease for a period of more than one week during breeding bird season.
- Surveys shall also be conducted during breeding season in those areas of the project site that a qualified biologist determines may have nesting special status bird species present that could potentially be impacted by indirect noise impacts of operations such as truck traffic or blasting at that time.
- If vegetation removal or cessation of mining activities on South Hill occurs only during the non-breeding season, between September 1 and ~~January~~ December 31, no surveys will be required.
- Results of the surveys will be forwarded to the County and CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis that will ensure that the potential for an impact on any nesting raptors or passerine birds is eliminated. Depending on the species, these can include buffer areas (up to several hundred feet in the case of raptors) or seasonal avoidance. Vegetation of any kind identified as supporting active nests will not be removed until nestlings have fledged. If survey results are positive for nesting birds, vegetation removal or mining on South Hill will not occur until submittal and review of reports and implementation of any necessary avoidance measures. Special-status bird sightings shall also be submitted to the CNDDB.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.3-15: The Department of Public Works shall verify the submittal of breeding bird surveys as part of routine quarry inspection or as a condition of any DPW permit, such as grading.

Level of Significance after Mitigation

Mitigation Measure P4.3-15 will mitigate direct and indirect impacts on special-status birds to less than significant levels.

Impact P4.3-16: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status bats at the Quarry site (Significant).

Several special-status bat species are expected to use habitat present at SRRQ. Bats are known to use the McNear's Brickyard kilns and chimneys for roosting purposes and may also use these structures for maternity roosts. Special-status bats may also use eucalyptus and oak trees for roosting purposes. Removal of trees as part of quarrying operations has the potential to result in direct impacts, including mortality, to special-status bats and may disrupt reproductive behavior as well. This would be a significant impact but could be mitigated to less than significant levels through implementation of Mitigation Measure P4.3-16, below.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.3-16: The applicant shall conduct Quarry operations in a manner that avoids direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula. This mitigation measure will be implemented through the following:

- A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of trees slated for removal as a result of quarrying activity. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night).
- Removal of trees showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal.
- A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Active bat roosts located within 500 feet and line of sight of existing centers of Quarry activities are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals will be prohibited.

- If surveys indicate that roosts are inactive or potential habitat is unoccupied, no further mitigation is required. Trees that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished.
- If known bat roosting habitat is to be destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed at least two weeks prior to such disturbance in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist.
- Prior to quarry-related tree removal a report shall be submitted to the County that details the survey results and any actions taken to protect special-status bats. Any special-status bat sightings shall also be submitted to the CNDDDB.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.3-16: The Department of Public Works shall verify that bat survey reports have been submitted as part of routine quarry inspection or as a condition of any DPW permit, such as grading.

Level of Significance after Mitigation:

Implementation of Mitigation Measure P4.3-16 will mitigate impacts to special-status bats to less than significant levels.

Impact P4.3-17: Ongoing quarrying activities under an Amended Surface Mining and Quarrying Permit may result in degradation of San Rafael Rock Quarry marsh habitat (Less than Significant).

Approval of the proposed AQP would result in an estimated 15-17 or more years of quarrying activity (or approximately 30 years greater than estimated under ARP82) and continued disturbance of these marshes. Under the proposed AQP there are no provisions to restore tidal influence until quarry reclamation begins. While it is unlikely that continuation of quarrying would result in a further direct loss of species diversity at this point, marsh habitat will continue to degrade due to continued poor function of tidal flow facilities and lack of tidal influence. Therefore, approval of the proposed AQP is expected to have an impact on the SRRQ marshes and their ability to continue to support a range of typical tidal marsh species. However, due to the degraded condition of the marshes, the increment of expected change in itself is expected to be minor, and is considered less than significant. Approval of the AQP is, however, expected to make a considerable contribution to a cumulative impact on the SRRQ marshes; see the Cumulative Impact discussion, below.

Ongoing quarrying activities could result in deposition of fugitive dust in the SRRQ marshes at higher than current rates, potentially contributing to further degradation of habitat there. While the dust produced by quarrying activities at SRRQ is relatively low in toxicity (see Section 4.2, Air Quality), dust can have adverse effects on important plant processes at high deposition rates,

including reduced photosynthesis due to reduction of available light and reduced gas exchange due to blockage of leaf pores (stomata) by particulates (Farmer 1997). This may lead to reduced plant growth rates and vigor, which may in turn contribute to overall degradation of marsh habitat for wildlife. If dust particulates are chemically active they can actually damage plant tissues. Dust can also affect ecosystems and, potentially, ecosystem processes through chemical interaction with soils. For example, deposition of alkali limestone dust can raise soil pH and this altered soil chemistry can result in loss of plant and animal species (Farmer 1997). However, there are few studies relating to the effects of dust deposition on natural systems (Farmer, 1997) and these types of impacts are difficult to quantify, particularly for individual species or habitat types. While it would be possible to implement a monitoring program to measure dust deposition in the marshes, it would be difficult, if not impossible, to quantify its effects on vegetation or wildlife or to correlate an increase in dust emissions with changes in vegetation or wildlife populations. Implementation of Mitigation Measures specified in Section 4.2, Air Quality, to reduce PM-10 emissions, which are more stringent than those currently in place will serve to reduce potential impacts of fugitive dust. Due to a lack of existing information on the effects of fugitive dust on marsh habitat, any attempt at analysis of the effects of dust deposition resulting from continued Quarry operations and reclamation grading would, at best, be considered speculative under CEQA. Therefore it is not possible to determine the level of significance of fugitive dust impacts on the SRRQ marshes in this EIR.

Under the proposed AQP there is also potential for erosion and sedimentation to impact the marshes and other wetland habitat and aquatic habitat at SRRQ. However, erosion and sedimentation control measures are more stringent under the proposed AQP than under existing permits. In addition, mitigation measures proposed in Section 4.5, Hydrology and Water Quality will also serve to minimize any impacts to wetlands and aquatic habitat to less than significant levels. Therefore, the potential for sedimentation of wetland and aquatic habitat is not expected to increase over current conditions and no impacts of this kind are expected.

Mitigation: None required.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

For a discussion of cumulative impacts of the proposed AQP and proposed ARP together with other past, present, and reasonably foreseeable future projects in the vicinity of SRRQ, see Chapter 5, Growth Inducing and Cumulative Impacts. This section examines the potential for cumulative impacts of the AQP and ARP combined.

Impact C4.3-18: Impacts of the ARP and AQP on the salt marshes present at the project site would make a considerable contribution to cumulative impacts on marsh habitat (Significant).

The 1899 San Francisco USGS 15 minute topographic quadrangle shows that a road to McNear's Brickyard was already in place across the Bayward edge of the SRRQ marshes. The road would

have been built on a levee so these marshes have been partially or entirely cut off from tidal influence for over 100 years. In 1899, and at least through 1915, the SRRQ marshes were also connected to a much larger area of tidal marsh, which has since been replaced by the Peacock Gap Golf and Country Club. Further examination of historical USGS topographic quadrangles and aerial photographs show that the current Quarry entrance road did not exist in 1942, but had been built by 1968. This means that, in addition to having been cut off from tidal influence over a century ago, the easternmost section of the marshes have been cut off from the western sections for nearly 40 years and perhaps up to two decades longer than that.

The long-standing fragmentation of these marshes and lack of tidal influence, as well as the destruction of adjacent and contiguous habitat, have already combined over time to degrade marsh habitat at SRRQ. While this habitat still provides some foraging and breeding habitat for more disturbance-tolerant species, it is likely that it is no longer used by species that are less tolerant to disturbance or that require larger, contiguous areas of habitat

ARP82 identified the marshes as areas to be preserved in a natural condition, and specified restoration of the marshes after cessation of mining activities. ~~The~~ One crucial component of such restoration ~~is~~ would ideally be reestablishment of tidal influence through hydraulic connectivity with the Bay. Mining did not cease within the timeframe contemplated in ARP82, and it can be reasonably surmised that the continued delay in establishing tidal action, in conjunction with the disturbing effects of noise, vibration, dust, vehicle and equipment operation, and human presence associated with continued operation of the Quarry, has further degraded the value of the marshes since approval of ARP82. While culverts, gates, and pumps are in place that would allow reestablishment of tidal action, SRRQ does not currently use these to enable tidal influence. The presence of surrounding roads and other infrastructure may impose significant constraints on reintroduction of tidal waters as this may have the potential to result in increased flooding along Point San Pedro Road and along the access roads into the project site. There may also be other ways to improve and enhance hydrologic retention and circulation within the marshes.

As discussed in Impact R4.3-5, Under ARP04, the continued lack of tidal circulation attributable to ARP04 alone is considered to have a less than significant impact on marsh habitat. Similarly, the effects of continued mining operations on the marshes under the proposed AQP is considered to have a less than significant impact (Impact P4.3-17). However, the effects of the two projects combined in delaying restoration of tidal circulation, and the continuing adverse effects of operations on marsh habitat, combined with the impacts of past projects, including ARP82, the issuance of the existing Surface Mining and Quarrying Permit, and earlier alteration of marsh hydrology and extent, is considered significant. The contribution of both the ARP and AQP to this impact is cumulatively considerable, and therefore significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure C4.3-18a: See Mitigation Measure ~~C~~R4.3-5a.

Mitigation Measures Identified in this Report

Mitigation Measure C4.3-18b: The applicant shall prepare a ~~Tidal~~ Marsh Restoration plan and implement the recommendations as soon as practicable, and in any case, shall complete

the ~~tidal~~ marsh restoration prior to completion of Phase 1 reclamation. This mitigation measure will be implemented through the following:

- The project proponent shall develop and submit a ~~Tidal~~ Marsh Restoration plan to the County and other applicable resource agencies within 1 year of approval of the AQP. The Plan will include, but not be limited to, the following elements:
 - A baseline study of existing marsh conditions, including topography, a complete analysis of current hydrology, vegetation, and wildlife that will be used to inform subsequent marsh restoration planning.
 - A thorough analysis of the potential effects of tidal restoration on adjacent infrastructure and existing marsh vegetation.
 - Development of a suite of restoration alternatives, with tidal restoration as the preferred alternative, providing constraints do not preclude this course of action.
 - Feasible goals for marsh restoration with quantifiable objectives that can be measured over time to determine whether goals are being met.
 - A detailed plan for marsh restoration, including, if necessary to achieve objectives, plans for excavation of new channels, addition of new culverts, setbacks, buffers, etc.
 - ~~An operations schedule for the existing tide gates that will provide for twice daily tidal inundation of the SRRQ marshes.~~
 - A maintenance schedule for ~~the~~ any mechanical devices or features, such as tide gates, specified in the plan.
 - A monitoring plan to determine optimum inundation levels for the marshes. This would include measurements of hydrology, sediment accretion, and changes in vegetation over time.
 - A schedule for annual monitoring reports, which shall be submitted to the ~~Community Development Agency~~ Department of Public Works, as well as all permitting agencies as required.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure C4.3-18: The Department of Public Works shall verify that that a Tidal Marsh Restoration Plan has been prepared within one year of approval of the AQP and shall monitor its implementation through periodic inspections and receipt of progress reports from the Quarry. The Department of Public Works, as well as any other permitting agencies (should permitting be required as part of restoration), shall review annual monitoring reports.

Level of Significance after Mitigation:

Implementation of Mitigation Measure C4.3-18b would reduce the contribution of the ARP and the AQP to cumulative impacts to the SRRQ marshes associated with lack of tidal inundation and ongoing quarrying operations to less-than-significant levels.

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4.4 Geology, Soils, and Seismicity

Approach to Analysis

This section evaluates whether the proposed 2004 Amended Reclamation Plan (ARP) would result in potential adverse impacts related to local geology, soil conditions, or seismicity. Because the Initial Study for the Amended Surface Mining and Quarrying Permit (AQP) found no potential for a significant impact of this kind related to mining operations, AQP impacts are not further considered in this section.

The analysis contained in this section is based, in part, on review of various geologic maps and reports. The primary sources include:

- *Evaluation of Quarry Slope Stability and Preliminary Geotechnical Reconnaissance, San Rafael Rock Quarry*, ENGEO, Incorporated (ENGEO, 2004)
- *Supplemental Geotechnical Data Report, Proposed Changes To Mining Plan, San Rafael Quarry*, ENGEO Incorporated (ENGEO, 2005)
- *Final Technical Memorandum*, Seidelman Associates, 2007
- Geologic and geotechnical reports and information from state and local agencies

Since the 1970s, various consultants have completed geologic and geotechnical studies at the project site. All of these studies have included some level of subsurface exploration, including core sampling. The *Evaluation of Quarry Slope Stability and Preliminary Geotechnical Reconnaissance* completed by ENGEO in 2004 summarizes these previous studies and incorporates previous findings finding from the studies into their conclusions and recommendations. As part of the analysis for this Environmental Impact Report (EIR), Paul Seidelman, a geotechnical engineer with Seidelman Associates, performed a peer review of the 2005 ENGEO report.

Setting

Regional Geology

The project area lies within the geologically complex region of California referred to as the Coast Ranges geomorphic province.¹ The Coast Ranges province lies between the Pacific Ocean and the Great Valley (Sacramento and San Joaquin Valleys) provinces and stretches from the Oregon border to the Santa Ynez Mountains near Santa Barbara. Much of the Coast Ranges province is composed of marine sedimentary deposits and volcanic rocks that form northwest-trending mountain ridges and valleys, running roughly parallel to the San Andreas Fault Zone. The Coast Ranges can be further divided into the northern and southern ranges which are separated by

¹ A geomorphic province is an area that possesses similar bedrock, structure, history, and age. California has 11 geomorphic provinces (CGS, 2002a).

San Francisco Bay. San Francisco Bay lies within a broad depression created from an east-west expansion between the San Andreas and the Hayward fault systems.

The Northern Coast Range consists primarily of the Franciscan Complex (also referred to as the Franciscan *Assemblage*), which consists primarily of “graywacke” (a name for sandstone with marine origins also referred to as “dirty sandstone”²), shale, greenstone (altered volcanic rocks), basalt, chert (ancient silica-rich ocean deposits), and sandstone that originated as ancient sea floor sediments. Graywackes are by far the most abundant rock of the Franciscan Complex, and can range in thickness from inches to hundreds of feet. Graywacke is thought to have been deposited by undersea, sediment-laden debris flows (referred to as turbidity currents) and is often associated with thin beds of marine shales (Bates and Jackson, 1985). Typically, graywacke is well-cemented and has not undergone significant structural, mineral, or chemical alteration by heat or pressure (a process called metamorphism) (CDMG, 1964). The graywacke of the San Rafael-Novato area is considered slightly metamorphosed from temperatures approaching 350 degrees Fahrenheit and pressures between two and seven kilobars; this grade of metamorphism is referred to by geologists as “prehnite-pumpellynite” (ENGE0, 2005).

Sand and sandstone contain small fragments of silica in the form of crystalline quartz, cristobalite, and tridymite. Quartz is one of nature’s hardest and most common minerals, with a hardness value of 7 out of a maximum of 10 (diamond). When observed in sediments or in a crushed specimen of sandstone, crystalline silica occurs as angular to rounded grains. Grains are usually rounded by some degree by weathering through natural processes (i.e. wind, water, abrasion). Grains of crystalline silica on ocean beaches, river bottoms, and sand dunes are typically rounded by weathering processes while igneous and metamorphic rocks have crystalline silica but it is bound in the matrix material of the rock. When metamorphic and igneous (volcanic) rocks are crushed, crystalline quartz is released from the rock matrix. If the crystalline silica is less than 10 microns (one-millionth of a meter) in size (e.g. fine silt to clay in size) it may be blown by the wind as dust and inhaled. The crystalline silica has sharp crystal faces rather than the round edges of weathered quartz, so the lungs cannot expel the sharp minute crystals and the quartz is retained in the lungs. The dust may stay in the air for a considerable time even after crushing activity ceases. For additional discussion of the potential health hazards and the risks related to the graywacke sandstone at Point San Pedro, please refer to Section 4.8, Hazards and Hazardous Materials.

Site Topography

The current topography within the San Rafael Rock Quarry (SRRQ) is highly variable and has changed significantly from its natural state due to over 100 years of mining operations. These operations have included changes to the original shoreline that, since 1895, has advanced into the San Pablo Strait from infilling of quarry spoils. The site’s most dominant feature is the Main Quarry Bowl which has a maximum depth of about 200 feet below mean sea level (msl). The

² Graywacke (German: graywacke, signifying a gray, earthy rock) is a variety of sandstone generally characterized by its hardness, dark color, and poorly-sorted, angular grains of quartz, feldspar, and small rock fragments set in a compact, clay-fine matrix.

highest point at the SRRQ is South Hill at an elevation of almost 300 feet msl. The Main Quarry Bowl walls are sloped at nearly vertical to 50 percent (1 foot vertical to 2 feet horizontal) with 200 percent (2 feet vertical to 1 foot horizontal) being typical. Graded benches are located around the Main Quarry Bowl and are 12 to 25 feet in width. The benches are used for mining activity and haul roads.

1982 Amended Reclamation Plan Final Contours

The proposed final contours at the cessation of quarrying under the existing 1982 Amended Reclamation Plan (ARP82) have not yet been achieved in some places. ARP82 calls for further mining of South Hill, primarily on its southeast face, which would then be benched and left as a clean rock face. The areas southeast of South Hill and adjacent to the Main Quarry Bowl would be graded for future residential and commercial development. An easterly passageway or channel would be cut from the existing land to connect the Main Quarry Bowl to the Bay allowing the Main Quarry Bowl to flood. Other earthmoving and grading operations, including filling and leveling, would take place in the NE Quadrant additional future residential development. The final depth of the bowl under the ARP82 would not be significantly different from the existing configuration.

Site Geology

The SRRQ is located on Point San Pedro, a peninsula that juts into San Pablo Strait; the strait separates San Francisco Bay from San Pablo Bay. Point San Pedro is underlain primarily by sandstone and shale of the Franciscan Complex (Blake, 2000). The sandstone at SRRQ is the graywacke discussed above, which is relatively intact in comparison to other exposures of Franciscan rocks (ENGEO, 2005). Nevertheless, it contains fractures that range from hairline cracks to larger fractures that can be a few feet wide. Most fractures in the graywacke have been naturally filled and sealed, over geologic time, with fine grained silica deposits. Based on available data, the available graywacke resource rock at the site appears to extend to at least 550 feet below sea level (ENGEO, 2005).

San Pedro Point geology along the Bay margin is characterized by artificial fill overlying marine and marsh deposits. The artificial fill consists of overburden removed from other areas of the site and quarry spoils. Prior to the mining operations, soils forming over colluvium were found at the base of the slopes but have been subsequently removed or buried by quarry spoils.³ The marine and marsh deposits consist of soft compressible silty clays known locally as Bay Mud. The thickness of the Bay Mud ranges up to 50 feet along the south shore and up to 90 feet along the east shore (ENGEO, 2005). Sandy soils possibly associated with former beach deposits have also been observed in some borings south of the pit.

³ Colluvial soils or colluvium refers to loose heterogeneous soil and rock material deposited by rain wash, or slow continuous downslope creep usually at the base of gentle slopes.

Soils

Past quarry operations have greatly altered the original topography of the project site and, as a result, many of the native soils are no longer present. This EIR effort included a review of the U.S. Department of Agriculture (USDA) Soil Conservation Service's *Soil Survey of Marin County, California* (1985) to determine soil conditions at the proposed project site. The soil conditions are discussed below.

The NW Quadrant is predominantly marsh land mapped as saline Hydraquents, a coastal soil of silt and clay with thin layers of peat. These soils are typically saturated and have a low hazard of erosion. The brick manufacturing plant and surrounding area is mapped as Xerorthents-Urban land complex which consists of filled tidelands or bay areas. The properties of this unit vary because of the kinds and amount of fill material used, however, the hazard of erosion and subsidence can be high in these soils. The NE Quadrant consists of mostly clay and gravelly loams known as the Saurin-Bonnydoon complex. These soils are found typically on hilly uplands and are formed from sandstone or shale. They have moderate permeability and a high water erosion hazard. Another upland soil mapped in this quadrant is the Tocaloma-McMullin complex, which consists of loam and gravelly loams similar in properties to the Saurin-Bonnydoon complex. The NE Quadrant also includes areas that have been stockpiled with quarry spoils. The SW Quadrant also has areas underlain by the Tocaloma-McMullin complex. The SE Quadrant is mapped as a rock quarry for which there is no soil.

Numerous subsurface soil investigations have been conducted at the project site over the years. Borings have been focused on the perimeter of the Main Quarry Bowl with some borings located along the shoreline. The east and south shorelines of the SE and SW Quadrants, as well as areas of the NE Quadrant, consist of fill materials from quarry spoils. These spoils include pebble to boulder sized gravels with a clayey sand matrix and range in thickness from a few feet to almost 60 feet (ENGE0, 2005). Quarry spoils have also been stockpiled north of the Main Quarry Bowl.

Groundwater

The predominating sandstone bedrock geology and presence of Bay Mud along its perimeter at the SRRQ precludes development of a defined groundwater basin. Regionally, the closest developed groundwater basin to the project site is the San Rafael Valley Groundwater Basin, which encompasses 896 acres and is located between San Quentin Point and San Rafael Creek. The San Rafael Valley Groundwater Basin is a small, coastal basin with boundaries that approximate the contact between the artificial fill and alluvium in the basin and the surrounding bedrock. The artificial fill is characterized as fill overlying San Francisco Bay Mud and the young alluvium.

Based on information from previous investigations and visible observations made within the Main Quarry Bowl, groundwater at the project site occurs in two different aquifer systems.⁴ The first system consists of the unconsolidated surface soils, fills, Bay Mud, and colluvium where groundwater has been encountered at relatively shallow depths. The second system consists of fracture flow through the bedrock at the site. The graywacke is tightly cemented with little

⁴ An aquifer is defined as a continuous unit of soil or rock that bears groundwater.

porosity due to the predominance of most fractures having been sealed by calcite fillings. As a result of the low porosity of the bedrock, as well as the mantling of low-permeability Bay Mud around the Bay margin, there is little to no seepage of groundwater in the Main Quarry Bowl. The Main Quarry Bowl, which is currently approximately 200 feet below msl, and only 350 feet from the Bay and is dry except for a small reservoir at the very bottom. The small reservoir is used for dust control and only rises slightly in the winter (ENGE0, 2005).

Seismicity

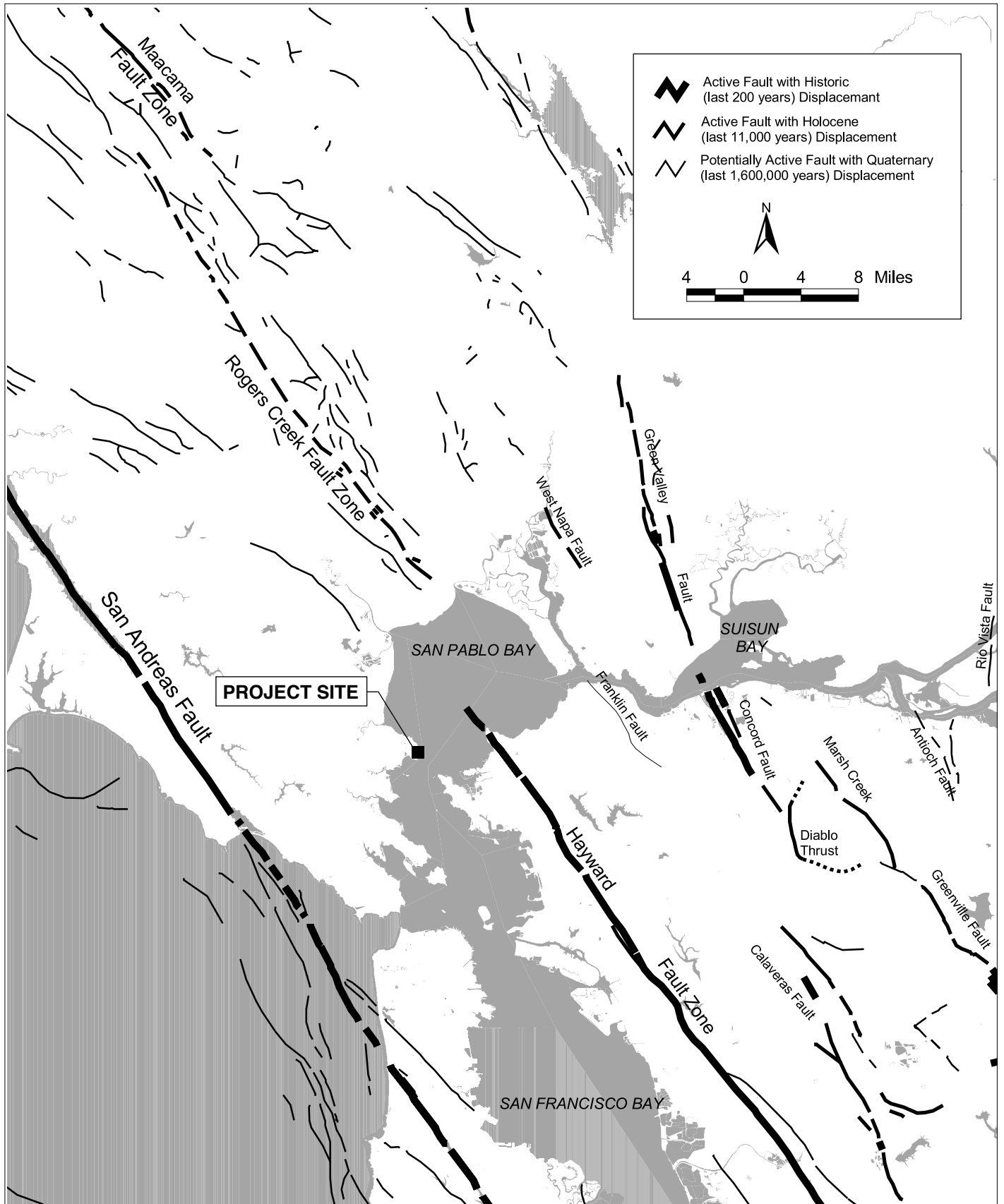
The San Francisco Bay Area is a region of high seismic activity with numerous active and potentially active faults.⁵ Major earthquakes have affected the region in the past and are expected to occur in the near future on one of the principal active faults in the San Andreas Fault System. The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities determined there is a 62 percent likelihood of one or more earthquakes of magnitude 6.7 or greater occurring in the greater San Francisco Bay Area within the 30-year period from 2002 to 2032 (USGS, 2003).

Richter magnitude (M) is a measure of the size of an earthquake as recorded by a seismograph. The reported Richter magnitude for an earthquake represents the highest amplitude measured by the seismograph at a distance of 100 kilometers from the epicenter. Richter magnitudes vary logarithmically, with each whole number step representing a tenfold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their moment magnitude (M_w), which is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and the movement or displacement across a fault (CGS, 2002b).

The San Andreas Fault System forms the boundary between the North American and Pacific crustal plates and includes the San Andreas, Hayward, San Gregorio, Rodgers Creek, Calaveras, Mt. Diablo thrust, Marsh Creek–Greenville, and the Concord–Green Valley faults (Figure 4.4-1). A number of these faults, such as the San Andreas and Hayward, have experienced significant activity during historic time (within the last 200 years). Table 4.4-1 lists the location of regionally active faults and potentially active faults significant to the project area due to proximity, activity status, date of most recent motion, and maximum moment magnitude (M_{max}). The M_{max} is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type, which are all related to the physical size of fault rupture and displacement across a fault.

The Hayward (when combined with the Rodgers Creek fault) and the San Andreas faults have the highest probabilities of generating a M 6.7 or greater earthquake before 2032 (USGS, 2003). A characteristic feature of the Hayward fault is its well-expressed and relatively consistent fault

⁵ An *active* fault is defined by the State of California as a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A *potentially active* fault is a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. *Sufficiently active* is also used to describe a fault if there is some evidence that Holocene surface displacement occurred on one or more of its segments or branches (Hart, 1997).



SOURCE: California Department of Conservation, Geological Survey (After Jennings, 1994)

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Figure 4.4-1
Principal Faults in the San Francisco Bay Area

**TABLE 4.4-1
 ACTIVE FAULTS IN THE PROJECT VICINITY**

Fault	Location and Direction from Project Site	Most Recent Movement	Fault Classification^a	Historical Seismicity^b	Maximum Moment Magnitude Earthquake (Mmax)^c
Hayward	4 miles Northeast	Historic (1868 rupture) Holocene	Active	M 6.8, 1868 Many <M 4.5	7.1
Rodgers Creek	12 miles North	Historic	Active	M 6.7, 1898 M 5.6, 5.7, 1969	7.0
San Andreas	13 miles Southwest	Historic (1906; 1989 ruptures)	Active	M 7.1, 1989 M 7.9, 1906 M 7.0, 1838 Many <M 6	7.9
Concord–Green Valley	20 miles East	Historic (1955) Holocene	Active	Historic active creep	6.8
Calaveras (northern)	28 miles Southeast	Historic (1861 rupture) Holocene	Active	M 5.6 to M 6.4, 1861 M 4 to M 4.5 swarms 1970, 1990	6.8
Marsh Creek–Greenville	35 miles Southeast	Historic (1980 rupture) Holocene	Active	M 5.6, 1980	6.9

^a Jennings, 1994, and Hart, 1997. An active fault is defined by the California Geological Survey as one that has had surface displacement within approximately the last 11,000 years. A potentially active fault is defined as a fault that has showed evidence of surface displacement during approximately the last 1.6 million years.

^b Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a seismic wave measured at a distance of 100 kilometers from the epicenter.

^c Moment magnitude is related to the physical size of a fault rupture and movement across a fault. The maximum moment magnitude (Mmax) is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type.

Sources: Jennings, 1994; Hart, 1997, Peterson.

creep.⁶ Although large earthquakes on the Hayward fault have been rare since 1868, slow fault creep has continued to occur and has caused measurable offset across the fault trace. Fault creep on the East Bay segment of the Hayward fault is estimated at 9 millimeters per year (mm/yr) (Peterson et al., 1996). However, a large earthquake could occur on the Hayward fault with an estimated Mmax of 7.1.

The San Andreas Fault was the source of two major seismic events in recent geologic history that affected the San Francisco Bay region. The 1906 San Francisco earthquake, estimated at M 7.9, resulted in approximately 290 miles of surface fault rupture, the longest of any known to occur on a continental strike-slip fault. The more recent 1989 Loma Prieta earthquake, with a magnitude of M 7.1, resulted in widespread damage throughout the Bay Area.

⁶ Fault creep is the slow, continuous deformation observed across a fault trace as a result of constant seismic stress.

The closest active fault to the project site is the Hayward fault. The project site is about equidistant to the Rodgers Creek and San Andreas faults.

Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered more likely along active faults, which are referenced in Table 4.4-1.

The entire project site is not within an Alquist-Priolo Earthquake Fault Zone, as designated through the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate project region. Therefore, the risk of ground rupture due to faulting at the project site is very low.

Ground Shaking

Earthquakes in the Bay Area could produce strong ground shaking in the project region. Ground-shaking intensity is partly related to the size of an earthquake, the distance to the site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. Violent ground shaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For instance, deep unconsolidated materials can amplify earthquake waves and cause longer periods of ground shaking whereas consolidated bedrock would experience sharp jolts for relatively shorter periods.

While the magnitude is a measure of the energy released in an earthquake, intensity is a measure of the observed ground-shaking effects at a particular location. The Modified Mercalli (MM) scale is commonly used to measure earthquake intensity due to ground shaking. Table 4.4-2 presents a description of the Modified Mercalli scale. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total). MM intensities ranging from IV to X can cause moderate to significant structural damage. The age, material, type, method of construction, size, and shape of a structure affect its performance in an earthquake.

The maximum ground-shaking intensity associated with the proposed projects is an estimated strong (MM VII) for the bulk of the project site and violent (MM IX) along the Bay margins during an Mw 7.1 or larger earthquake on the Hayward fault (ABAG, 2003a).⁷

As a comparison, the 1906 San Francisco earthquake, with an M 7.9 on the San Andreas fault, produced shaking intensities modeled to range from moderate (MM VI) for the majority of the project site and violent along the Bay margins (MM IX) of the project site.

⁵ The magnitude of 7.1 is a moment magnitude (Mw) developed to represent a characteristic earthquake for the Association of Bay Area Governments shaking intensity models.

**TABLE 4.4-2
MODIFIED MERCALLI INTENSITY SCALE**

Intensity Value	Intensity Description	Average Peak Acceleration (% g ^a)
I	Not felt except by a very few persons under especially favorable circumstances.	< 0.17
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	0.17–1.4
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck.	0.17–1.4
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	1.4–3.9
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.	3.5–9.2
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	9.2–18
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving.	18–34
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	34–65
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked. Underground pipes broken.	65–124
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed over banks.	> 124
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 124
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 1.24

^a g (gravity) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.

SOURCES: ABAG, 2003b; CGS, 2003. Peterson 1996.

Ground motion during an earthquake can also be described using the motion parameters of acceleration, velocity, and duration of shaking. A common measure of ground motion is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. Of the few values measured in the Marin area from the Loma Prieta earthquake, the closest one to the project site was 0.04 g (CDMG, 1990). However, an earthquake on the nearby Hayward fault would likely produce far more severe ground shaking in the project area than was observed during the Loma Prieta earthquake. The PGA calculations for the project site indicate that peak ground accelerations for the site could reach as high as 0.6 g in the project region (ENGE0, 2005).⁸

Secondary Earthquake Hazards

Secondary earthquake hazards in the project region include earthquake-induced landsliding, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. Settlement is the gradual downward movement of an engineered structure (such as a building) due to the compaction of material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and, in severe situations, building collapse and bending or breaking of underground utility lines. Soil liquefaction (a phenomenon in which soils lose strength) can result in ground failure. The soils most susceptible to liquefaction are shallow deposits of clean, loose, uniformly graded, saturated, cohesionless fine sands. In general, the presence of sand lenses in Bay Muds presents the potential for liquefaction whereas areas underlain by dense soils containing clay or rock are not susceptible to the liquefaction process.

Other Geologic Hazards

Landslides and Slope Failures

A slope failure or landslide is a mass of rock, soil, or debris displaced downslope by sliding, flowing, or falling. Slope failures occur as a function of slope and type of materials, and may be triggered by events such as large amounts of rain, human activities such as excavation or mining, or seismic activity. The rate of rock and soil movement can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout the state of California, but the density of incidents increases in zones of active faulting. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a steep slope, can move downslope rapidly in a fluid-like state. Landslide-susceptible areas are typically characterized by steep slopes and an active downslope creep of surface materials.

⁸ PGA values were calculated using a deterministic seismic hazard assessment approach. First, the faults near a site are identified and assessed for activity. Then, for each seismic source, an earthquake scenario consisting of the maximum magnitude a fault is capable of generating at the closest distance to the site is used to determine the ground motion estimate.

Rock failures are not uncommon in the process of quarry operations where blasting techniques are used to break up massive bedrock deposits. Exposed rock slopes, especially those altered and fractured by mining or quarry extraction, can break away from a weakened portion of the slope or a newly created overhang, causing the rock mass to fall. Steeply inclined rock fractures can intersect to form a plunging wedge shape that is prone to instability. An unplanned rock failure also referred to as a wedge failure occurred at the project site in 1998 following a blasting episode (ENGEO, 2005). According to interviews with the former quarry manager, the failure was not associated with any rainfall event, but rather occurred following an attempt to remove some loose material created from a blasting event. The failure apparently did not affect the brow of the Main Quarry Bowl and the movement was swift. Beginning in 2000, blasting practices have been modified to improve conditions at the Quarry. The changes include removing material below the area to be blasted, drilling additional holes in order to “pre-split” targeted material, and staged blasting in increments to limit the width of blasted zone. The results of the new blasting practices have shown improved control of face orientation and minimal degradation of the resultant quarry face (ENGEO, 2005).

Seiche and Tsunami

A seiche is a seismically generated water wave in a lake or bay. The wave is caused by shaking of the ground surrounding and beneath the enclosed or semi-enclosed body of water. A tsunami is a seismically generated water wave resulting from significant and rapid terrestrial displacement adjacent to or beneath open water. Seismic waves of 20 feet in height are anticipated at the entrance to San Francisco Bay on a 200 year recurrence interval and are expected to decrease to 10 feet at the Richmond-San Rafael Bridge (Ritter and Dupre, 1972). Section 4.56, Hydrology and Water Quality discusses seiche and tsunamis as they relate to flood inundation.

Regulatory Framework

Mine Safety and Health Administration

The Mine Safety and Health Administration (MSHA), a division of the U.S. Department of Labor, administers the provisions of the Federal Mine Safety and Health Act of 1977. MSHA develops and enforces mandatory safety and health regulations pursuant to the Code of Federal Regulations (CFR) 30 that apply to all surface and underground mines located in the U.S. through inspections, rigorous training, and provision of educational programs for employers and employees in the mining industry. The ultimate purpose is to eliminate fatal accidents, reduce the frequency and severity of nonfatal accidents, minimize health hazards, and promote improved safety and health conditions in mines of the United States. Project operations are regulated by MSHA, and periodic inspections are performed under MSHA regulations to ensure maximum worker safety during project operation. The continued mining operations at the project site are subject to periodic safety inspections by MSHA.

Surface Mining and Reclamation Act

The primary state law concerning conservation and development of mineral resources is the California Surface Mining and Reclamation Act (SMARA) of 1975, as amended to date. SMARA

is found in the California Public Resources Code (PRC), Division 2, Chapter 9, Sections 2710, et seq. SMARA was enacted in 1975 to limit new development in areas with significant mineral deposits. SMARA calls for the state geologist to classify the lands within California based on mineral resource availability. In addition, the California Health and Safety Code requires the covering, filling, or fencing of abandoned shafts, pits and excavations (California Health and Safety Code Sections 24400-03).

SMARA sets state policy for the reclamation of mined lands. SMARA states that the extraction of minerals is essential to the continued economic well-being of the state and to the needs of society, and that reclamation of mined lands is necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. The reclamation of mined lands will permit the continued mining of minerals and will provide for the protection and subsequent beneficial use of the mined and reclaimed land. Surface mining takes place in diverse areas where the geologic, topographic, climatic, biological, and social conditions are significantly different, and reclamation operations and the specifications therefore may vary accordingly (California Public Resources Code Section 2711).

The regulations set forth in SMARA are to be used as standards by the lead agencies which can include cities, counties, the San Francisco Bay Conservation and Development Commission, or the board itself. The lead agency shall have principal responsibility for approving surface mining operation or reclamation plans which include grading, backfilling, resoiling, revegetation, soil compaction, erosion control, and other reclamation requirements.

Office of Mine Reclamation

Created in 1991 to administer the Surface Mining and Reclamation Act of 1975 (SMARA) the Department of Conservation's Office of Mine Reclamation (OMR) provides assistance to cities, counties, state agencies and mine operators for reclamation planning and promotes cost-effective reclamation. OMR strives to reclaim mined lands to a beneficial end-use through the implementation of SMARA, prevent or minimize the adverse environmental effects of mining by providing assistance to lead agencies and miners in the review of reclamation plans, and minimize residual hazards to public health and safety through the Abandoned Mine Lands program.

Marin County Surface Mining and Quarrying Operations Ordinance

Marin County's Surface Mining and Quarrying Ordinance is contained in Chapter 23.06 of the Marin County Code. The Ordinance includes measures that pertain to reclamation of surface mining and quarrying operations. The following applies to reclamation plans:

23.06.050 Land Reclamation Requirements

Application for a site approval or reclamation plan for surface mining or land reclamation projects shall be made on forms approved by the Marin County public works department. The application shall be filed in accord with this chapter and procedures to be established by the public works director. The forms for reclamation plan applications shall require, at a minimum, each of the elements required by Surface Mining and Reclamation Act and state

regulations, and any other requirements deemed necessary to facilitate an expeditious and fair evaluation of the proposed reclamation plan, to be established at the discretion of the lead agency. As many copies of the site approval application as may be required by the lead agency shall be submitted to the lead agency. Copies of the site approval application will be forwarded to the State Department of Conservation for comments and to the Marin County department of public works. The Department of Conservation will be allowed thirty days to conduct a review of the site approval application in addition to the county review period.

Unless otherwise specified in the use permit or Surface Mining and Quarrying Permit, reclamation shall be done in the following manner:

- (1) Grading required under the approved reclamation plan shall be carried out as soon as practicable.
- (2) Grading shall be carried out to provide a surface as nearly natural appearing as possible, or to provide a surface consistent with the land use objectives stated in the approved reclamation plan. In all cases, grading shall be done in such a manner as to minimize erosion.
- (3) Within ninety days of termination of the actual rock or mineral production, all structures, metal, lumber or other debris resulting from the operation, are to be removed or buried. Such burial is subject to the provisions of the reclamation plan, requirements of the California Environmental Quality Act and approval of the director of public works. If specified in the reclamation plan, a structure or materials may be retained on the site for the stated land use objective anticipated after completion of the operation, subject to the approval of the director of public works.
- (4) Earth dams may be constructed wherever the formation of lakes for water impoundment does not interfere with the operations or damage adjoining property and is in conformance with the land use objectives in the reclamation plan.
- (5) Grading shall be carried out so as to cover, with at least two feet of overburden or other relatively inert natural rock materials, any acid forming or other toxic materials which are exposed by the operations. Such burial is subject to the requirements of the California Environmental Quality Act.
- (6) All other parts of the reclamation plan are to be completed concurrently with the grading or as soon as practicable after completion of the grading specified in the plan. (Ord. 3301 §4, 1999; Ord. 1844 §2 (part), 1971)

The Marin Countywide Plan Update (2007)

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to geology, soils, and seismicity are discussed in Section 4.6, Land Use and Planning.

Impacts and Mitigation Measures

Significance Criteria

In accordance with Appendix G of the California Environmental Quality Act Guidelines (CEQA *Guidelines*), a geologic or seismic impact is considered significant if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
 - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
 - Strong seismic ground shaking
 - Seismic-related ground failure, including liquefaction
 - Landslides
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Appendix N of the Marin County EIR Guidelines contains similar significance criteria.

Based on the scope of the proposed project, the project would not result in impacts associated with fault rupture or wastewater disposal. No impact discussion is provided for these topics for the following reasons:

- **Fault Rupture.** The faults most susceptible to earthquake rupture are active faults, which are faults that have experienced surface displacement within the last 11,000 years. There are no active faults that cross the project site, and the nearest active fault (the Hayward-Rogers Creek Fault) is at least four miles away. Therefore, the potential for fault rupture to affect the proposed project is very low.
- **Strong Seismic Ground Shaking.** The San Francisco Bay Area would likely experience at least one major earthquake (M 6.7 or higher) within the next 30 years that would affect the project site. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the moment magnitude, and the duration of shaking. The shaking could range in intensity from strong to violent with the bay margins of the site experiencing the more intense range of shaking. Prior to and during reclamation activities, the ARP would not result construction of any structures or include any element that would involve the congregation of people at the site. Therefore, there would be no potential for injury or structural damage as a result of seismic ground shaking and consequently no impact.

However, after reclamation, development of the site is proposed to include residential, commercial, and marina development that would have the potential for injury or structural damage as a result of seismic ground shaking. Therefore, impacts of this kind are considered only for proposed post-reclamation use of the site.

- **Unstable Soils.** The proposed phased reclamation plan calls for significant grading and earthwork activities with the construction of temporary and permanent fills and slopes. The temporary slopes would receive minimal compaction and slopes will range from 1.5:1 (1.5 horizontal to 1 vertical) or 1:1 if allowed by a California registered geotechnical engineer. However, the temporary fills and slopes will be completely removed during the final phase of reclamation. The permanent slopes will receive compaction to industry standards ranging from 95 percent relative compaction at depth (over 50 feet) to 87 percent to 92 percent for the upper five feet of finished grade. Permanent slopes would be no steeper than 2:1. As the ARP would not result in construction of any structures or include any element that would involve the congregation of people at the site during the phased reclamation period, few people and no structures would be exposed to the lower standards stated for temporary slopes. Adherence to the proposed reclamation plan as required and overseen by the Office of Mining Reclamation would eliminate the potential for creating unstable soils that could result in injury or damage to structures, and therefore there is no impact.
- **Liquefaction.** The potential for liquefaction, according to available resources from the Association of Bay Area Governments, ranges at the project site from very high to very low (ABAG, 2004). The areas that are considered very high consist of shoreline deposits which likely coincide with underlying Bay Mud deposits which can contain liquefiable sand lenses. The proposed project does not include the construction of any structures that would be at risk from potential liquefiable soils.
- **Expansive Soils.** The proposed project does not include the construction of any structures that would be at risk from potential expansive soils.
- **Wastewater Disposal.** The proposed project does not require the use of septic or other alternative disposal wastewater systems, therefore no impact associated with this hazard would result.

Impacts of the Amended Reclamation Plan

Impact R4.4-1: Prior to the completion of site reclamation, the project site could be subject to slope instability hazards, including landslides, debris flows, and rockfalls caused by seismic or non-seismic mechanisms (Significant).

The Main Quarry Bowl has relatively steep bedrock slopes which are mostly competent but do contain joint fractures. The mining proposed for South Hill would result in relatively steep slopes. Bedrock contacts, fractures, weathering and shear zones provide areas of weakened rock that can become dislodged and then fall or roll towards lower elevations. Blasting associated with mining operations can also trigger unstable fractures or shear zones and produce wedge failures. If unstable slopes in weak material are not stabilized during mining and quarrying operations, landsliding, rockfalls, and debris flows could occur over time.

The final proposed excavation of the Main Quarry Bowl would produce over 350 feet of exposed bedrock slope with an overall slope that would not exceed an inclination of 60 degrees. Benches

at a minimum of 30 foot widths would be constructed at 90 foot intervals for the purpose of providing slope stability. Between benches, the face slopes could reach but not exceed up to 75 degrees in inclination.

Quantitative slope stability analyses, which included slope stability modeling, was conducted to evaluate slope stability under the proposed reclamation plan (ARP04) (ENGEO, 2004 and ENGEO, 2005). The slope stability analysis was presented in the Supplemental Geotechnical Report prepared by ENGEO, Inc., which was reviewed by the Office of Mine Reclamation (OMR) and other geotechnical consultants. The OMR and independent peer reviews generally concurred with the findings of the report (Pompy, 2005, Martin, 2006, and Seidelman, 2007).

The slope stability analysis conducted to evaluate this project provided a quantitative assessment of the proposed mining configuration under dry (mining) and flooded (post-reclamation) conditions considering both static and pseudo-static (earthquake) conditions. One of the main objectives of a slope stability analysis is to determine the slope factor of safety (FOS). Expressed as a numeric figure, the FOS represents the ratio between the resisting forces of the soil or bedrock mass and the shearing or driving forces (e.g. gravitational forces and internal pressures). Therefore, a FOS exceeding 1.0 is considered stable because the forces that resist slope failure are greater than those that cause failure to occur. The State Mining and Geology Board Reclamation Regulations establish minimum standards for the stability of reclaimed mining slopes. Section 3704(f) of the regulations requires that “cut slopes, including high walls and quarry faces, shall have a minimum slope stability factor of safety that is suitable for the proposed end use and conform with the surrounding topography and/or approved end use.” Generally accepted geotechnical practices for the San Francisco Bay Area regard a slope safety factor of 1.5 as suitable for development under static or non-earthquake conditions. For pseudo-static or earthquake conditions, a lower safety factor is typically used because a higher factor cannot be practically achieved.

By considering the site-specific bedrock conditions and applying conservative assumptions to the analytical model, the slope stability analysis developed for the project determined a FOS of 1.1 to 1.15 for earthquake conditions, indicating the quarry slopes would remain stable under earthquake conditions. A FOS of 1.1 to 1.15 was deemed appropriate for the proposed project and within accepted practice in the Bay Area (ENGEO, 2005). A factor of safety of 1.5 was determined for static conditions. The slope stability analysis for the project site determined that both the static and pseudo-static factors of safety for the Main Quarry Bowl slopes were within generally accepted limits for mining and reclamation assuming that the pit is flooded as part of reclamation (ENGEO, 2005).

Blasting at the project site was evaluated for this EIR by Revey Associates, a consulting firm with an expertise in blasting and mining operations. When explosive charges detonate in rock, they are designed so that most of the energy is used in breaking and displacing the rock mass in a very localized area. The extent of the crushed zone is usually limited to one or two charge radii (half the diameter of the charge hole) (Revey, 2006). However, other effects such as radial cracks and vibrations can occur beyond the crushed zone. A comparison of ground motions and

displacements that could occur from a typical blasting episode at the quarry was compared to those that were experienced from the 1989 Loma Prieta Earthquake. The resultant displacement of the 1989 event was approximately 2.5 inches whereas a typical blast at the project site would theoretically cause a displacement of only 0.0009 inches (Revey, 2006). There was also a considerable difference between the duration of events with the 1989 earthquake lasting approximately 36 seconds and a blasting episode lasting only 2 seconds. Therefore, the design of stable slopes according to earthquake standards would more than account for any potential deformation caused by blasting.

The slope stability analysis determined that the mining and Post-reclamation slopes would have a FOS above 1.0 and therefore would remain stable provided that certain geotechnical engineering measures are implemented into the project. Without these engineering measures, slopes failure could occur and, according to the significance criteria, could result in a significant impact. Mitigation measures, implemented as part of this project, would ensure that adequate geotechnical engineering considerations are applied to reduce slope instability hazards and therefore, the impact would be less than significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.4-1: The applicant shall include the recommendations made in the Supplemental Geotechnical Data Report Proposed Changes to Mining Plan by ENGEEO, Incorporated dated April 11, 2005 as part of the proposed project. These recommendations include conducting supplemental geotechnical pit observations, groundwater monitoring, and slope monitoring which shall be conducted by a California Certified Engineering Geologist or Registered Professional Geotechnical Engineer with oversight by the State Office of Mine Reclamation. In addition, the average slope inclination shall not exceed 60 degrees for a maximum vertical height of 350 feet, a minimum of 30-foot-wide benches shall be constructed at maximum 90-foot intervals, and inter-bench face inclinations shall not exceed 75 degrees.

Mitigation Measures Identified in this Report

None.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.4-1: It is anticipated that the requirements of Mitigation measure R4.4-1 will become conditions of approval of the ARP, and as such, will be monitored by the Marin County Department of Public Works.

Level of Significance after Mitigation

Mitigation Measure R4.4-1 would reduce this impact to a less than significant level.

Impact R4.4-2: Soil erosion of exposed cut or fill slopes, native slopes with removed vegetation, and soil stockpiles could result in soil erosion and loss of topsoil (Significant).

Soil erosion hazards could occur during reclamation activities, especially during initial site grading and stripping, when stock piles of loose soil and rock materials would be present, and during placement and compaction for reclamation features. The majority of soil erosion on construction sites is caused by precipitation and storm water runoff, although wind erosion can increase erosion rates, especially in loose, fine-grained materials. In addition to causing sedimentation problems in on-site and off-site drainage features, rapid water and wind erosion can create deep gullies that increase in size, and if not repaired, can undermine engineered soils. According to the significance criteria above, substantial erosion would be a significant impact to this project considering the extent of future mining and grading operations. Mitigation measures presented below would ensure that soil erosion hazards remain less than significant throughout the duration of mining and under post-reclamation conditions.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.4-2a: The applicant has prepared a Stormwater Management Plan and Stormwater Pollution Prevention Plan that specifies best management practices for reducing erosion and sedimentation. The applicant has also prepared Standards for Stormwater and Erosion Control of Reclaimed Areas and Standards for Revegetation of Reclaimed Areas, both of which will apply to reclamation activities (see Chapter 3, Project Description).

Mitigation Measures Identified in this Report

Mitigation Measure R4.4-2b: The project applicant shall incorporate into the grading and construction specifications provisions requiring that all phases of construction implement best management practices (BMPs) to reduce and eliminate soil erosion and loss of topsoil. The contractor shall implement these BMPs, and the contractor shall be responsible for the inspection and maintenance of the BMPs through all phases of reclamation.

Mitigation Measure ~~R4.5-1~~ R4.5-2b in Section 4.5, Hydrology and Water Quality, also contains measures that would serve to further mitigate potential erosion effects.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.4-2: It is anticipated that the requirements of Mitigation measure R4.4-2b will become conditions of approval of the ARP, and as such, will be monitored by the Marin County Department of Public Works.

Level of Significance after Mitigation

Mitigation Measures R4.4-2a and R4.4-2b would reduce this impact to a less than significant level.

Impact R4.4-3: Unstable slopes or soils could adversely affect post-reclamation land uses of the Quarry site (Significant).

Following the completion of the proposed mining and all four phases of proposed reclamation, the project site would be prepared for post-reclamation development that would include

residential, commercial and marina development. While this analysis does not consider the potential impacts of the post-reclamation use (a separate environmental review will be conducted of the Quarry's development plan, which is to be submitted three years prior to the anticipated cessation of quarrying), it does consider the suitability of the reclamation plan for the intended post-reclamation use. While geotechnical analysis of the Quarry's mining plan demonstrates adequate stability of the Main Quarry Bowl during ongoing mining operations and reclamation, uncertainty remains regarding the adequacy of slope stability for post-reclamation development. This uncertainty stems from the fact that the conditions and properties of the final slopes cannot be predicted until mining exposes them. There remains, therefore, a potential for the final quarry slopes to be inadequately stable for the intended post-reclamation use and according to the significance criteria, slope instability that could lead to risk of loss, injury or death must be considered a significant impact. Mitigation measures below would provide the means to reduce impacts to less than significant.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.4-3a: The proposed grading and other earthwork activities included in ARP04 would be designed such that all potential development areas would be located on either bedrock or consolidated engineered fill, with known and predictable strengths and stability.

Mitigation Measure R4.4-3b: The geotechnical recommendations provided in the Supplemental Geotechnical Data Report, which are being implemented as part of the project (see Mitigation Measure R4.4-1) include the preparation of a design-level geotechnical investigation following the cessation of mining.

Mitigation Measures Identified in this Report

Mitigation Measure R4.4-3c: The additional studies recommended in the Supplemental Geotechnical Data Report and specified in Mitigation Measure R4.4-3b will include a study to determine how the site may be developed following reclamation in order to avoid or mitigate to less than significant impacts related to soil and slope stability.

At the time the study is prepared, there will be a greater understanding of the bedrock stability and the properties and performance of the quarry walls. A comprehensive re-evaluation of slope stability shall be performed based on results from geotechnical observations throughout the mining period, groundwater monitoring, slope monitoring, and laboratory testing of on-site materials which would include compression tests and shear tests of joint surfaces.

The design-level, site-specific geotechnical investigation shall be prepared by a California licensed Geotechnical Engineer or Certified Engineering Geologist and include review of the supplemental geotechnical evaluations and monitoring conducted throughout the history of mining activities. The investigation shall include final grading recommendations, mitigation of any identified compressible or liquefiable soils, slope stability analyses, calculation of factors of safety, and structural foundation recommendations to ensure that post-reclamation development will be in accordance with the then-current requirements of the California Building Code and the Marin County Building and Safety Division or City of

San Rafael Building Code. These recommendations shall be incorporated into the final design plans for post-reclamation development.

Mitigation Measure R4.4-3d: If the design-level, site-specific geotechnical investigation specified above determines that achievement of factors of safety adequate for the intended post-reclamation uses are infeasible in some or all of the reclaimed Quarry, the report shall specify appropriate alternative post-reclamation uses or limitations on the planned use.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.4-3: It is anticipated that the specifics of the final Development Plan, including site-specific geotechnical investigation and application of its results, will become conditions of approval of the ARP, and as such, will be monitored by the Marin County Department of Public Works.

Level of Significance after Mitigation

The combination of Mitigation Measures 4.4-3a-d would reduce this impact to a less than significant level.

Impacts of the Amended Surface Mining and Quarrying Permit

Potential impacts of the Amended Surface Mining and Quarrying Permit to geology, soils and seismicity were examined in the San Rafael Rock Quarry Amended Surface Mining and Quarrying Permit Initial Study and determined to be less than significant.

Cumulative Impacts

Please refer to Chapter 5, Growth-Inducing and Cumulative Effects, for consideration of all applicable cumulative impacts to geology, soils and seismicity.

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- Seidelman Associates, *Geotechnical Hazard Evaluation for Amended Reclamation Plan 2004, San Rafael Rock Quarry*, February, 2007, (Appendix K).
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4.5 Hydrology and Water Quality

This section describes both existing hydrology and water quality at the San Rafael Rock Quarry (SRRQ) site, and potential effects on hydrology and water quality should the proposed Amended Reclamation Plan (ARP04) be implemented. Because the Initial Study for the Amended Surface Mining and Quarrying Permit (AQP) found no potential for a significant impact of this kind related to mining operations, AQP impacts are not further considered in this section.

The hydrologic data and information regarding San Rafael Rock Quarry and the vicinity were obtained from a variety of sources, including published and unpublished reports, maps, and internet resources, as noted below.

Regional Setting

The project area lies within the San Francisco Bay Area Hydrologic Basin. The San Francisco Bay functions as the drainage outlet for waters of the Central Valley and includes the main Bay segments as well as the areas that drain to them. The region's waterways, wetlands, and bays mark the centerpiece of the United States' fourth largest metropolitan region. Because of its highly dynamic and complex environmental conditions, the basin supports an extraordinarily diverse and productive ecosystem. The basin's deepwater channels, tidelands, and marshlands provide a wide variety of habitats that have become increasingly vital to the survival of several plant and animal species.

San Francisco Bay can be divided into distinct water bodies that have different physical and chemical properties. The northern reach includes three major embayments: Suisun Bay, San Pablo Bay, and Central Bay. The northern reach conveys outflow from the Sacramento-San Joaquin River Delta at its head and thus can be considered to be a typical estuary. Central Bay is deeper and more oceanic in character than the northern and southern reaches because of its proximity to ocean inflow through the Golden Gate, a deep narrow channel through the outer coastal range. The southern reach is separated from the northern reach by the Central Bay and extends from the Oakland Bay Bridge to San Jose.

Fresh water strongly influences environmental conditions in the San Francisco Bay Estuary. Over 90 percent of the estuary's fresh water originates from the Sacramento and San Joaquin rivers and enters the northern reach (RWQCB, 2006). The Sacramento River provides about 80 percent of this flow, and the San Joaquin River and other streams contribute the remainder. The remaining 10 percent of freshwater comes from the San Francisco Bay watershed and flows into the southern reach. The southern reach, like the northern reach, has the physiographic characteristics of an estuary but usually lacks the fresh water inflow to drive a strong estuarine circulation. As a result, circulation in the southern reach is influenced predominantly by tides, evaporation, and wastewater discharges and thus functions much like a tidally oscillating lagoon for most of the year.

In the San Francisco Bay Basin Plan, the Regional Water Quality Control Board (RWQCB) identifies a number of beneficial uses of surface waters that must be protected. The beneficial uses for San Pablo and San Francisco Bays include estuarine habitat, preservation of rare and endangered species, fish migration, fish spawning, wildlife habitat, navigation, recreation, commercial and sport fishing, and industrial service supply (RWQCB, 2006).

Local Setting

The San Rafael Rock Quarry is located in the San Pedro Watershed,¹ which includes San Pedro Creek and two former perennial creeks located to the southwest of the project site (Oakland Museum, 2006). The easternmost of these runs through the Peacock Gap golf course. All three of these gulches drained into San Rafael Bay. Otherwise drainage at the project site ultimately flows either to San Pablo Bay or San Francisco Bay.

Climate

The San Francisco Bay Area has a Mediterranean climate with cool, wet winters and warm, dry summers. The majority of precipitation (95 percent) falls as rain from October through April. The nearest climate data recording station to the SRRQ site is located in San Rafael at the Marin County Civic Center. Average rainfall at this location for the period between 1948 and 2005 is 36 inches per year; minimum and maximum recorded annual precipitation is 13 inches (1990) and 60 inches (1973), respectively (Western Regional Climate Center, 2006). During severe winter storms, the project site can receive relatively large volumes of precipitation in a short period of time.

Project site drainage

The site's drainage patterns have been dramatically altered from their original configuration as a result of long-term mining activities. Currently, most of the site drains into the Main Quarry Bowl in the SE Quadrant and as a result there is a reservoir at the base of the bowl. The NE and NW Quadrants drain to the marshlands in the NW Quadrant. For the SW Quadrant, those waters not draining into the Main Quarry Bowl drain directly into San Francisco Bay. Shoreline areas also drain toward the Bay.

Flooding

The majority of the project site is located in an area of minimal flooding (FEMA, 1982). The marsh areas of the NW Quadrant of the project site, however, are located within the 100-year flood hazard zone as mapped by the Federal Emergency Management Agency (FEMA). Areas mapped within the 100-year flood hazard zone may be inundated during the 100-year storm event (a storm expected to occur, on average, once every 100 years). Areas within the 100-year flood hazard zone may also be inundated during less severe events. However, during less severe events, the inundation depths and extent of the area affected would be expected to be less.

¹ The San Rafael General Plan 2020 refers to this area as the McNear Watershed.

Groundwater

Depth to groundwater across the project site varies greatly. According to borings conducted during investigations for the supplemental geotechnical data report that focused on areas surrounding the Main Quarry Bowl, groundwater was observed from 6 to 36 feet below ground surface within the surficial soils and fill materials (ENGE0, 2005). These borings were located outside the Main Quarry Bowl along the south shoreline. Groundwater appears to flow in two different systems at the project site: within the surficial soils, fill materials, and Bay Mud; and also within the fractures of the bedrock. However, groundwater does not appear to be seeping through the rock walls into the Main Quarry Bowl, which currently extends to approximately 200 feet below mean sea level (msl). The Main Quarry Bowl walls are, for the most part, dry with the exception of one area at the site of a drain outlet. The reason for the lack of groundwater seepage is likely due to the presence of thick and relatively impermeable Bay Mud that mantles the shoreline areas, as well as a very competent bedrock material. Although the existing bedrock has many fractures, they are naturally sealed with calcite fillings that prevent groundwater seepage. Elsewhere on the site, it is expected that the occurrence of groundwater is variable and that perched groundwater zones may exist. Low lying areas, such as McNear's Brickyard, may contain very shallow groundwater levels. Refer to Section 4.4, Geology, Soils, and Seismicity for additional discussion of groundwater conditions.

Water Quality

San Francisco Bay

Freshwater flows from the Delta affect the influx of pollutants in the Bay. Water movements within the Bay disperse and eventually transport toxic materials out of the Bay through the Golden Gate. Circulation is relatively complicated in San Francisco Bay because of the complex geometry and the variable amount of freshwater flow during the year. The circulation of water in the Bay is driven by tides, wind, and estuarine circulation. Estuarine circulation is driven by the density difference between freshwater and saline ocean water, and its magnitude is controlled by the amount of fresh water flowing into the Bay from the Delta. Tides are responsible for most of the water motion within the Bay and contribute greatly to dispersion patterns. However, tidal motion contributes little to the transport of material out of the Bay: net transport into and out of the Bay is driven primarily by estuarine circulation.

The Central San Francisco Bay is included on the 2002 California 303(d) List (EPA approved in 2003) as an impaired water body resulting from the presence of chlordane, DDT, diazinon, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, PCBs (non dioxin-like and dioxin-like), and selenium. The 303(d) list identifies the sources of each pollutant including unknown nonpoint sources, municipal point sources, resource extraction, atmospheric deposition, nonpoint sources, industrial point sources, agriculture, natural sources and exotic species. The 303(d) program has been and will continue to be administered through California's permitting process, which is administered by the State Board and its nine Regional Water Quality Control Boards.

San Pablo Bay

The physical characteristics (i.e. salinity, temperature, and suspended solids) of the waters of San Pablo Bay vary greatly on a given day due to its location between the less salty Suisun Bay and the saltier San Francisco Bay. The interaction between the fresh and saline water has a major influence on the circulation of water in San Pablo Bay itself. When freshwater and saltwater meet, the denser saltwater tends to flow under the freshwater until the waters are mixed by stronger tidal currents and winds.

While the major source of freshwater to San Pablo Bay is inflow from the Delta, other surface water flow, including the Napa and Petaluma Rivers, stormwater runoff, and groundwater all are important sources of fresh water to San Pablo Bay.

Surface runoff creates the majority of freshwater flows within the rivers and streams. Consequently, stream flow in all the creeks and rivers varies from season to season depending on precipitation. Most of water flow during a given year occurs during the rainy season, from November to April. Flows in many of the smaller streams located in the upper reaches of the watershed are intermittent and start to run dry after the end of the rainy season. Major streams intercept some groundwater in their lower reaches, which allows them to flow all year.

San Pablo Bay is included on the 2002 California 303(d) List (EPA approved in 2003) as an impaired water body resulting from the presence of chlordane, DDT, diazinon, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, nickel, PCBs (non dioxin-like and dioxin-like), and selenium. The 303(d) list identifies the sources of each pollutant-ranging from unknown nonpoint sources (for PCBs) to municipal point sources, resource extraction, atmospheric deposition, natural sources, nonpoint sources, industrial point sources, agriculture, natural sources, ballast water, and exotic species (for selenium).

Stormwater Runoff

The Quarry site is designed so that much of the stormwater runoff from active quarry and processing areas drains toward the Main Quarry Bowl. The Quarry operates under a Waste Discharge Permit as part of a General Permit for Stormwater Discharges Associated with Industrial Activity as administered by the San Francisco Regional Water Quality Control Board. For Quarry operations, one of the main concerns for water quality is sedimentation due to the significant amount of fines that are produced through mining and processing activities. Runoff that does not drain towards the Main Quarry Bowl flows toward the Bay.

Regulatory Framework

Federal

The major federal legislation governing the water quality aspects of the project is the Clean Water Act, as amended by the Water Quality Act of 1987. The objective of the act is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” Section 303 of

the Clean Water Act requires states to establish water quality standards consisting of designated beneficial uses of water bodies and water quality standards to protect those uses for all waters of the United States. Under Section 303(d) of the Clean Water Act, states, territories and authorized tribes are required to develop lists of impaired waters. Impaired waters are those that do not meet water quality standards, even after point sources of pollution have installed the required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waterways on the lists and develop action plans to improve water quality.

State and Regional Water Quality Control Board

The State of California's Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California. The primary responsibility for the protection and enhancement of water quality in California has been assigned by the California legislature to the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the RWQCBs conduct planning, permitting, and enforcement activities. The SWRCB provides state-level coordination of the water quality control program by establishing statewide policies and plans for the implementation of state and federal laws and regulations. The RWQCBs adopt and implement water quality control plans (basin plans) that recognize the unique characteristics of each region with regard to natural water quality, actual and potential beneficial uses, and water quality problems.

The project area lies within the jurisdiction of the San Francisco Bay RWQCB. The San Francisco Bay RWQCB has set water quality objectives for all surface waters in the region. Of particular importance to the proposed project is the Basin Plan turbidity standard (since quarries are known sediment producers), which states "increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU (RWQCB, 2004). Also, of importance to the proposed project is the Basin Plan minimum dissolved oxygen requirement of 5.0 mg/L.

Industrial Activity Permitting

Mining activities at the project site are subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Stormwater Associated with Industrial Activities Excluding Construction Activities (referred to hereafter as the General Permit). The General Permit, which is administered by the RWQCB, regulates discharges from certain types of industrial facilities, including mining operations. The General Permit requires regulated facilities to (among other things):

- Prepare and maintain a Stormwater Pollution Prevention Plan;
- Implement stormwater best management practices (BMPs) to minimize discharge of pollutants in runoff;
- Conduct regular inspections of the facility, during both wet and dry weather;

- Collect and analyze samples of runoff at least twice per year from each discharge location; and
- Prepare and submit annual reports on stormwater management activities.

California Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act of 1975 (SMARA), as amended, provides guidelines for mineral extraction designed to prevent or minimize the negative public health, property, and environmental impacts associated with surface mining. As related to hydrologic and water quality issues, the process of reclamation includes maintaining water quality, minimizing flooding and erosion damage to wildlife and aquatic habitats caused by surface mining. The requirements of the Act apply to any surface mining operations that disturb more than one acre or remove more than 1,000 cubic yards of material. Therefore, the San Rafael Rock Quarry is subject to the requirements of SMARA.

Marin County Surface Mining and Quarrying Ordinance

Marin County's Surface Mining and Quarrying Ordinance is contained in Chapter 23.06 of the Marin County Code. The Ordinance includes measures that pertain to reclamation of surface mining and quarrying operations. Many of these measures pertain to grading and revegetation which have a direct effect on runoff and water quality. The following applies to reclamation plans:

23.06.050 Land reclamation requirements

Application for a site approval or reclamation plan for surface mining or land reclamation projects shall be made on forms approved by the Marin County public works department. The application shall be filed in accord with this chapter and procedures to be established by the public works director. The forms for reclamation plan applications shall require, at a minimum, each of the elements required by Surface Mining and Reclamation Act and state regulations, and any other requirements deemed necessary to facilitate an expeditious and fair evaluation of the proposed reclamation plan, to be established at the discretion of the lead agency. As many copies of the site approval application as may be required by the lead agency shall be submitted to the lead agency. Copies of the site approval application will be forwarded to the State Department of Conservation for comments and to the Marin County department of public works. The Department of Conservation will be allowed thirty days to conduct a review of the site approval application in addition to the county review period.

Unless otherwise specified in the use permit or surface mining and quarry permit, reclamation shall be done in the following manner:

- (1) Grading required under the approved reclamation plan shall be carried out as soon as practicable.
- (2) Grading shall be carried out to provide a surface as nearly natural appearing as possible, or to provide a surface consistent with the land use objectives stated in the approved reclamation plan. In all cases, grading shall be done in such a manner as to minimize erosion.

- (3) Within ninety days of termination of the actual rock or mineral production, all structures, metal, lumber or other debris resulting from the operation, are to be removed or buried. Such burial is subject to the provisions of the reclamation plan, requirements of the California Environmental Quality Act and approval of the director of public works. If specified in the reclamation plan, a structure or materials may be retained on the site for the stated land use objective anticipated after completion of the operation, subject to the approval of the director of public works.
- (4) Earth dams may be constructed wherever the formation of lakes for water impoundment does not interfere with the operations or damage adjoining property and is in conformance with the land use objectives in the reclamation plan.
- (5) Grading shall be carried out so as to cover, with at least two feet of overburden or other relatively inert natural rock materials, any acid forming or other toxic materials which are exposed by the operations. Such burial is subject to the requirements of the California Environmental Quality Act.
- (6) All other parts of the reclamation plan are to be completed concurrently with the grading or as soon as practicable after completion of the grading specified in the plan. (Ord. 3301 §4, 1999; Ord. 1844 § 2 (part), 1971)

Marin Countywide Plan Update (2007)

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to hydrology and water quality are discussed in Section 4.6, Land Use and Planning.

Impacts and Mitigation Measures

Significance Criteria

The significance criteria for this hydrologic and water quality impact analysis are adapted from the California Environmental Quality Act Guidelines (CEQA *Guidelines*), Appendix G and the Marin County CEQA Environmental Impact Review (EIR) Guidelines (Adopted May 17, 1994). Based on these guidelines, hydrologic impacts resulting from the proposed mining operations and future reclamation would be considered significant if the project would result in any of the following hydrologic conditions.

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge or resources such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on or off the site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off the site;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems;
- Otherwise substantially degrade water quality;
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of failure of a levee or a dam; or
- Result in inundation by seiche, tsunami, or mudflow.

Issues Determined to Have No Impact on Proposed Project

Considering the characteristics of the project and site, including geophysical location and topography, certain potential hydrologic conditions presented in the Significance Criteria would not pertain to the proposed project because they do not represent a potential impact to the environment. The proposed project does not include placement of structures that would impede flood flows nor would the project be subject to impacts associated with dam failure. These issues are discussed below.

Placement of Structures in Floodways

The proposed project is located in an area defined by FEMA as an area subject to minimal flooding, with only the low-lying marsh areas of the NW Quadrant being located within the 100-year flood hazard zone (FEMA, 1982). The proposed project would not include residential or commercial development within the low-lying marsh areas because these areas are not considered suitable areas of development and are preserved under the 1982 ARP at SRRQ. The other quadrants lie outside of the 100-year flood zone.

Dam Inundation

The closest dam is at Phoenix Lake, which is approximately seven miles to the southwest of the SRRQ. Based on that distance and given the topographic characteristics of the project site, flood water generated from failure of the Phoenix Lake dam would not reach the project site. Failure of the Phoenix Lake Dam, which is under jurisdiction of the California Division of Safety of Dams (DSOD) is very unlikely. Further, the project site is not mapped in any dam inundation hazard as defined by the Association of Bay Area Governments (ABAG, 1995). Dam failure is not considered a potential impact to the proposed project.

Impacts and Mitigation Measures

Impacts of the Amended Reclamation Plan

Impact R4.5-1: The proposed project could alter current groundwater conditions beneath the site and interfere with groundwater resources on adjacent properties or local groundwater recharge (Less than Significant).

The groundwater conditions beneath the site are not conducive for developed municipal or domestic supply. A recent geotechnical study of the project site (ENGEO, 2005) revealed that groundwater is present in the unconsolidated surface deposits, including localized shallow fill materials, colluvium, and Bay margin deposits, and to a lesser extent, in fractures of the surrounding sandstone resource rock. Groundwater contained in unconsolidated surface deposits would not yield a continuous and reliable supply nor would the quality of the groundwater be suitable for domestic supply. Groundwater present in the sandstone fractures is not available for reliable extraction due to the sandstone's low porosity and the lack of available open fractures. For these reasons, there is currently no groundwater extraction occurring at the Quarry and groundwater pumping is not part of the proposed project. Source water for the current and future Quarry operations would be obtained from the stormwater pond at the bottom of the Main Quarry Bowl. Groundwater pumping for municipal supply does not occur on lands adjacent to SRRQ; the City of San Rafael receives its water from surface water sources managed by the Marin Municipal Water District. Although there may be some groundwater extraction from shallow private wells in the offsite vicinity of SRRQ, given the geology of the area there is a very low potential that the localized shallow groundwater at SRRQ is hydraulically connected to shallow source wells offsite and offsite wells are not expected to be affected by groundwater conditions, mining, or reclamation activities at the project site.

The proposed project would not reduce the ability of surface water to recharge the underlying shallow and deep groundwater-bearing zones, through, for example, the addition of impervious surfaces. Percolation from precipitation and runoff is the primary route of shallow and deep groundwater recharge, which occurs to varying degrees throughout the site dependant on topography and underlying geology. For instance, recharge of the sandstone bedrock is much slower than that of the shallow fill or colluvium primarily because the pore spaces are more readily available to accept water in the colluvium. The actions proposed under the 2004 Amended Reclamation Plan (ARP04) involve the deepening of the Main Quarry Bowl and phased reclamation of the site. Although these proposed changes would extend the period of rough grading and soil stockpiling, these activities would not reduce the areas that are otherwise currently available for shallow or deep groundwater recharge. Further, groundwater recharge is not a significant issue for this project because groundwater is not used at the project site or in the vicinity as a municipal or industrial water source. Therefore, the rate of recharge into the shallow groundwater or bedrock is not a vital consideration for the groundwater regime underlying the project site.

Actions proposed under ARP04, specifically the increased depth of the Main Quarry Bowl, may change the groundwater conditions adjacent to the project site by gradually increasing the gradient of the groundwater occurring in the sandstone bedrock and the surface fills and colluvium. Because the groundwater in the bedrock is essentially isolated in sporadically distributed fracture sets, the effects of this steepened gradient would be realized immediately adjacent to the Main Quarry Bowl and would not translate laterally beyond the boundaries of the site and would not impact groundwater conditions offsite. The significance criteria above state that a significant impact could occur if the project alters groundwater conditions such that it substantially depletes groundwater supplies, interferes with groundwater recharge, or causes a net decrease in aquifer volume or a lowering of the local groundwater table. Although the proposed actions under ARP04 could change groundwater conditions in the immediate vicinity of the Quarry, these changes would not affect the regional groundwater condition or prevent use of groundwater offsite. This impact is therefore less than significant.

Mitigation: None required.

Impact R4.5-2: Grading associated with the proposed project would increase the potential for eroded sediments to degrade the quality of surface water sources including the San Francisco Bay (Significant).

Reclamation and quarrying activities proposed under ARP04 would include earthmoving such as rough grading and soil stockpiling. These types of activities expose soil to erosion that, in turn, can result in discharge of sediment to the Bay and other surface water bodies. Sediment degrades water quality and large amounts of sediment can adversely affect the habitat of aquatic species. Construction operations also generate other pollutants such as diesel and hydraulic fluid that if released to the environment could degrade waters of the Bay or the marsh areas in the NW Quadrant. Most large construction projects rely on Best Management Practices (BMPs) to control runoff and downstream sedimentation. As described in the Regulatory Framework discussion above, these BMPs are employed on a site in conformance with a Stormwater Pollution Prevention Plan (SWPPP), which is required by the RWQCB. During each phase of the proposed reclamation, SRRQ would be required to adhere to their NPDES Permit for Industrial Activities (Waste Discharge ID #2 21003840), which includes a SWPPP and a Stormwater Management Plan (ARP, 2004). The Stormwater Management Plan includes construction and post-construction BMPs designed to reduce potential adverse hydrologic impacts of the project, while minimizing the concentration of pollutants found in the runoff. In accordance with the SWPPP, erosion control would be implemented prior to the onset of the rainy season.

Analysis of this impact consisted of reviewing the proposed reclamation grading plan for each Phase and determining whether the erosion control and revegetation plan would be adequate to ensure that potential water quality impacts resulting from erosion and sedimentation remain less than significant.

Earthmoving would take place in four phases throughout the operational life of the SRRQ, as described in Chapter 3, Project Description. In all, approximately 2.3 million cubic yards of cut and the equivalent quantity of fill will occur over the course of four phases within a period of 18 years. The major grading operations include construction of surcharge and visual screening berms, development and maintenance of stockpiles, excavation of existing berms, stockpiling and management of topsoil and removal and mixing of pond fines. In addition, grading would also include the alteration by excavation of the final contours on South Hill. All these activities would require use of large capacity heavy equipment including graders, scrapers, and bulldozers and therefore generate substantial areas of loosely consolidated, exposed soil.

Erosion control for the proposed project is specified in the SWPPP for each reclamation phase described in ARP04. The primary strategy for long-term stormwater and erosion control during reclamation would be permanent and temporary vegetation on exposed slopes. Other BMPs, including the use of fiber rolls, erosion control fabric and structural prevention measures, would be used in areas as needed. SRRQ has established specific measures for stormwater and erosion control that apply to exposed slopes, steep swales, flat swales, additional fill areas, and finished fill planes.

The standards and specific BMPs developed by SRRQ for stormwater and erosion control under ARP04 are industry-accepted and widely used methods for large construction grading projects. When properly applied and monitored, they can effectively attenuate concentrated stormwater flows and reduce erosive stormwater flows. The development of erosion control strategies under each phase of grading appears adequate to control stormwater runoff and erosion. However, continual maintenance and monitoring of a particular BMP is essential to success in reducing water quality impacts. For instance, SRRQ proposes to use fiber rolls, rock check dams, and erosion control blankets where necessary on steep swales and problem areas to reduce erosion and sediment transport. These systems have been proven effective but must be regularly monitored and maintained or they can become virtually ineffective. If the prescribed BMPs fail due to improper maintenance and monitoring, significant sedimentation in the runoff could be generated during a storm event that could degrade water quality in the marshes (NE Quadrant), and the Bay (SE and NE Quadrants). Post-reclamation water quality degradation could occur in the flooded Main Quarry Bowl and Bay if long-term erosion and stormwater control strategies fail due to lack of monitoring and maintenance. For example, clogged fiber rolls could cause sedimentation into the marsh areas (NW Quadrant) or energy dissipators in the SW Quadrant could be overcome by large flows and failure if not properly maintained.

The significance criteria above state that an impact to a project is significant if it causes a violation of a water quality standard or changes flows in such a way as to cause erosion or siltation. Stormwater management and erosion control under the proposed ARP04 would implement erosion control strategies and BMPs, as well as apply standards for stormwater and erosion control in reclaimed areas. These measures should provide adequate protection against water quality degradation provided they are maintained effectively and monitored regularly. Without monitoring and maintenance, water quality degradation could occur and trigger a significant impact. The mitigation measures presented below would ensure that the stormwater

and erosion control measures prescribed as part of the project remain intact and functional throughout the operational life of the SRRQ and in post-reclamation development.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.5-2a: ARP04 includes a Stormwater Management Plan and Stormwater Pollution Prevention Plan, both of which will be implemented as part of the project.

Mitigation Measures Identified in this Report

Mitigation Measure R4.5-2b: The applicant shall include as part of the SWPPP and Stormwater Management Plan, a monitoring and maintenance element that would require scheduled periodic monitoring of BMP performance and condition. At a minimum, stormwater and erosion control BMPs shall be monitored after major storms, prior to the first rain event, and midway through large storm events extending over several days. Temporary BMPs (e.g. fiber rolls) shall be monitored for performance and immediately replaced if necessary. Performance and failure of BMPs shall be described in the annual report to the RWQCB as required under the SWPPP. Monitoring and maintenance shall be conducted by an erosion control specialist contracted by the applicant. Monitoring and maintenance reports shall be filed with the applicant and available to the County on request.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.5-2: The Marin County Public Works Department will be responsible for monitoring implementation the above mitigation measure, which will become a condition of approval of the project. Monitoring will occur during periodic inspections of the Quarry.

Level of Significance after Mitigation

The combination of Mitigation Measures R4.5-2a and R4.5-2b would reduce this impact to less than significant.

Impact R4.5-3: Sedimentation inside entrance channel due to both tidal currents and bank material slumping may be substantial and result in the need for periodic dredging operations and water quality impacts (Less than Significant).

The proposed project would introduce tidal flows into the harbor basin, which would transport sediment into the basin and the entrance channel. Additional sedimentation may occur due to slope failures and slumping of soil from the slopes adjacent to the channel. The sedimentation in the entrance channel area, particularly seaward of the jetties, may experience sedimentation rates of more than 1 foot per year, especially following initial construction. The accumulation of sediment would require periodic dredging of the channel. Reclamation activities would include excavation and dredging operations possibly in the areas just outside the entrance of the proposed harbor entrance channel. Dredging to remove accumulated sediments would occur during initial

development of the channel and throughout the life of the project. Dredging operations would cause bottom disturbance, increased sediment load, reduction in dissolved oxygen, and mobilization and release of substances such as nitrogen, phosphorous, and ammonia. This process could result in adverse impacts to water quality in the immediate channel, the harbor or San Pablo Bay. In addition to the dredging activity, disposal of the dredged material could cause a significant adverse impact depending upon the sediment quality; however, this impact analysis assumes that dredge spoils would be transported to a regulated disposal site and thus, dredge spoils disposal is not considered a part of the project or this analysis.

Typically, dredging in San Francisco and San Pablo Bay is a highly regulated activity requiring review from various agencies including the RWQCB and Army Corps of Engineers. The dredging activities required as part of the ARP04 reclamation activities would require various agency approvals. The project sponsor would be required to obtain necessary dredging permits and comply with all water quality certifications and requirements for dredging activities, which includes a Section 404 permit process pursuant to the U.S. Army Corps of Engineers (USACE) and pursuant to the oversight, permitting, and approval of the Dredged Material Management Office (DMMO). The DMMO consists of representatives from the U.S. Environmental Protection Agency (USEPA) Region 9, USACE-San Francisco, RWQCB-San Francisco Bay, Bay Conservation and Development Commission (BCDC), and the State Lands Commission.

Through the required permitting and reporting requirement associated with dredging operations, the applicant would be required to conduct rigorous water quality protection and controls during the operation to reduce the lateral migration of the sediment plumes and contain the area that may be subject to temporary water degradation. Water quality protection measures could include installation of a silt curtain surrounding the areas of work, temporary sheet piles to contain areas of intense disturbance, and water quality monitoring.

The significance criteria states that the project would result in a significant impact if it violates water quality standards or degrades water quality. Although the proposed project would require dredging, the regulatory requirements for protection of San Pablo Bay and other beneficial use water bodies are adequately stringent to ensure that water quality impacts associated with dredging would be less than significant.

Mitigation: None required.

Impact R4.5-4: Project construction would involve activities (excavation, soil stockpiling, boring and pile driving, grading, and dredging, etc.) that would generate loose, erodible soils that, if not properly managed, could affect stormwater runoff and violate applicable water quality standards or waste discharge requirements; or otherwise substantially degrade water quality (Less than Significant).

Construction activities related to the proposed project include those operations associated with the development of a harbor channel such as construction of jetties, placement of revetment, and pile

driving. These activities have the potential to degrade water quality through the inadvertent release of diesel and hydraulic fuels, which could cause a disturbance of sediment resulting in localized increase in turbidity. Construction water quality impacts are temporary and managed through standard, industry accepted BMPs, which are managed and monitored by the contractor conducting the work. The applicant will be required to complete a SWPPP for each phase of reclamation. The SWPPP would specify the type of BMP, its placement, and the monitoring requirements. SWPPPs are required for all construction projects that disturb over 1-acre of land and contain specific requirements as set forth by the RWQCB, the California agency required to administer to Clean Water Act (see Regulatory Framework section, above). Given this level of regulation surrounding construction and the requirements of contractors to protect surface water sources, during the project, water quality impacts associated with construction activities are considered less than significant.

Mitigation: None required.

Impact R4.5-5: The proposed flooding of the Main Quarry Bowl would result in a deep body of water that may have insufficient water circulation and increased residence time. This condition could degrade water quality within the shallower water in the harbor (Less than Significant).

The flooded Main Quarry Bowl would be approximately 400 feet deep, making it the deepest body of water in the San Francisco/San Pablo Bay region. Water enclosed in a deep, small embayment would not circulate at the same rates as waters in the shallower San Francisco and San Pablo Bays. Circulation is crucial process for it replaces oxygen in the water, distributes nutrients, and flushes pollutants. For this analysis, residence time is defined as the time it takes for a pollutant to be flushed out the harbor entrance; high residence times lead to stagnant, deoxygenated water, which is not hospitable to many aquatic species within San Francisco and San Pablo Bays. Water quality in the proposed harbor may be adversely impacted by a long residence times due to its relatively small footprint and 400 feet of depth. However, the water at the surface of the harbor basin and Bay would be exchanged more frequently due to tides and/or currents; the entrance channel has been designed to minimize residence times within the harbor basin.

Coast & Harbor Engineering conducted numerical modeling to study the circulation and water quality impacts in San Francisco Bay and the harbor basin due to the flooding of the harbor basin (CHE, 2007a). Tidal circulation modeling was performed in the depth-averaged mode of the ADCIRC model. The ADCIRC model simulates current flows and water level fluctuations caused by tides. The tidal circulation model was verified with predicted tide data from near the Richmond-San Rafael Bridge and measured current data from Point San Pedro.

The currents from the ADCIRC model were used as an input to a numerical dye flushing model (RMA4) for the project area and surrounding San Francisco Bay water. The model simulations were completed for both summer and winter conditions in the San Francisco Bay to determine

residence time within the harbor basin. Conservative, longer, residence time estimates were developed by using summer conditions (smaller exchange), a conservative dispersion coefficient, and excluding winds and wind-waves as mixing factors. The water outside the marina started with an initial concentration of zero and inside the marina started at a concentration of 100 percent for all numerical dye simulations. Residence time was calculated as the approximate time required for dye concentrations within the harbor basin to be reduced to below 36.8 percent, $1/e^2$, of the original concentration. The concentration of 36.8 percent is an accepted threshold of dilution.

The numerical dye flushing model results indicate that the residence time of the surface water, top 30 feet, in the vicinity of the entrance channel may be less than a day; far from the entrance channel, the average flushing time of surface water may be three weeks. Residence times in certain areas of the San Francisco and San Pablo Bay systems (e.g. the Oakland Inner Harbor) can approach three weeks without noticeable degradation of surface water. The significance criteria state that a project would have a significant impact if it otherwise substantially degraded water quality. In this case, the surface water modeling determined that water within the first 30 feet of depth in the proposed harbor would adequately circulate, although the surface water may require up to the three weeks to flush pollutants. Because the three weeks residence time adequately protects beneficial uses of surface water elsewhere in the Bay, it follows that the surface water within the first 30 feet in the proposed harbor would adequately recirculate and likewise not result in degradation. This impact would be less than significant.

Mitigation: None required.

Impact R4.5-6: Poor water quality conditions could occur in the deep water within the flooded Main Quarry Bowl due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin (Significant).

As discussed in Impact R4.5-5, above, the surface water (surface to about 30 feet depth) in the proposed harbor would adequately circulate and surface water degradation would not be expected to occur. This impact focuses on the water in the harbor at depth beyond 30 feet that would extend to a depth of 400 feet; the harbor would be more than 300 feet deeper than the adjacent waters of San Pablo Bay. Circulation and flushing is crucial for oxygenating water and flushing pollutants. The deep water in the basin, 30 to 400 feet deep, may have a flushing time on the order of months (Moffatt & Nichol, 2004; CHE, 2007a). The long flushing times could cause stagnation and reduced oxygen with depth, which would adversely impact aquatic species. Furthermore, vertical mixing of the low oxygen, stagnant water with water nearer to the surface could degrade shallower, higher quality water. In addition to deep stagnation and reduced dissolved oxygen in the water, the harbor basin would become stratified due to differences in temperature and salinity (density) between the shallow and deep water. There may be some

² e is a mathematical expression for the inverse of the natural logarithm.

vertical exchange over certain water depths, but this would likely be small compared to the horizontal exchange in the surface due to tides.

In addition, it is likely that mercury-laden sediments will be brought into the flooded basin with the tide, and deposited on the bottom where, in the low dissolved oxygen environment, they will be subject to methylation. Methylated mercury may enter the aquatic food web, contributing to potential impacts to fish, piscivorous birds, and humans through bioaccumulation of methylmercury. This aspect of this impact is also discussed in Section 4.3, Biological Resources.

The water quality in deep water would be impacted due to stagnation and stratification. The significance criteria states that the project would result in a significant impact if it degrades water quality. The low-oxygen, stagnant water that is likely to occupy the deeper portions of the proposed harbor would be considered degraded and the harbor would be considered an impaired water body that could not support the beneficial uses. In this case the primary beneficial uses are aquatic habitat, which depends on oxygenated water. The impact is therefore considered significant.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure 4.5-6: Reducing the depth of the Main Quarry Bowl prior to flooding would result in a harbor with an average depth similar to the remainder of San Pablo and San Francisco Bay. To accomplish this, the Main Quarry Bowl would need to be backfilled from its proposed final depth of 400 feet to a finished depth of approximately 30 to 40 feet. The backfill material could be any inert solid material and possible materials could range from dredge spoils to construction debris. It would be expected that most, if not all materials would have to be trucked into the site or offloaded and placed in the quarry using the applicant's barge dock. Prior to filling the Main Quarry Bowl, the backfilled materials would have to be covered using a low permeability cap material such as clay or Bay Mud. The cap material would need to be certified as clean fill. There would be several potentially substantial secondary impacts for such a mitigation measure, which include increased truck trips and/or barge trips, increased use of the barge loading area, and associated diesel particulate air quality impacts. This mitigation measure would significantly alter the project as a whole and the overall project schedule, and in conjunction with potentially substantial adverse secondary effects, is deemed not to be feasible as mitigation for the project as proposed. The backfilling of the quarry bowl to reduce water depth to meet water quality standards is considered in the Alternatives analysis of this EIR, as a component of the Mitigated Alternative. Other Alternatives considered included not breaching the bowl and utilizing it as a fresh water storage reservoir, (at a lower water depth), or retaining the bowl unfilled for an alternate end use.

Two alternate mitigation measures could include some type of deep water oxygenation/aeration procedure or opening another channel on an opposing side of the harbor to allow a greater degree of deep water mixing. According to our analysis, oxygenation/aeration would be difficult to present as mitigation because, considering the depths of the proposed harbor, the technology may not currently exist. Cutting an opposing channel may increase mixing but may not mix water at depth. The effectiveness of a second channel to mitigate

~~this impact would require additional modeling and geotechnical study. These measures are therefore also deemed not to be feasible for the project as proposed.~~

Within one year of approval of the Amended Reclamation Plan, the applicant shall submit a concept engineering and economic report for use and future maintenance of a mechanical mixing or aeration system, or another engineered approach, that will result in avoidance or elimination of a stratified water column within the Main Quarry Bowl after it is flooded. The report will be conducted by qualified limnologists and water quality engineers. The system design will be at a schematic level and will be stamped by a California professional engineer, and will include calculations that demonstrate that the system will maintain water quality objectives established in the San Francisco Bay Regional Water Quality Control Board's Basin Plan. The report will include an analysis of operating and maintenance costs for the system, as well as predicted energy requirements and greenhouse gas emissions, and a plan for minimizing both of these; and will identify a funding source to ensure continued operation of the system after reclamation.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.5-6: The Marin County Department of Public Works will be responsible for reviewing the report and schematic design specified in Mitigation Measure R4.5-6.

Level of Significance after Mitigation

~~Due to the potential infeasibility of available mitigation measures discussed above, the impact remains significant and unavoidable. There is a high likelihood that the deep waters of the~~

~~flooded Main Quarry Bowl would experience poor water quality, likely in violation of RWQCB Basin Plan standards. Mitigation scenarios are few and those that could actually reverse the potential long term water quality issue could be viewed as a considerable undertaking, with questionable technical feasibility and with potentially significant secondary impacts. Mitigation Measure 4.5-6 will ensure that this impact is reduced to less than significant.~~

Impact R4.5-7: The creation of the harbor basin may impact the currents, flow patterns, and water quality conditions in San Francisco Bay. Changes in circulation and water quality would be minimal beyond the entrance to the harbor/marina and only occur in close proximity to the entrance channel. Therefore, the project would not significantly alter currents, flow patterns, and water quality of San Francisco Bay (Less than Significant).

The creation of the harbor basin could impact the currents, flow patterns, and water quality conditions in San Francisco Bay. Coast and Harbor Engineering (CHE) completed numerical modeling to quantify impacts to currents, flow patterns, and water quality conditions. The CHE circulation modeling, as described in the impact discussions above and in their modeling report (CHE, 2007a), examined circulation and water quality both in the harbor basin and in the San Francisco Bay.

The circulation modeling results indicate that some areas near the shoreline downstream of the shore-normal jetties would experience a reduction in current speeds due to the introduction of the harbor basin and jetty construction. The reductions are not expected to cause a significant change in erosion or sediment patterns since the velocities would still be generally high enough to prevent sedimentation of fines. The circulation model results represent a conservative evaluation of potential impacts. Therefore, the changes in circulation discussed above are expected to be smaller than reported in the modeling results (CHE, 2007a).

Water quality in San Francisco Bay is dominated by tidal processes in areas of strong tidal currents (e.g. San Pablo Bay). Model simulations indicate that San Francisco Bay circulation patterns and water quality are not expected to be significantly changed by the project. Therefore, the impact of the project to circulation patterns and water quality within San Francisco Bay is less than significant.

Mitigation: None required.

Impact R4.5-8: The project reclamation and post-reclamation activities would result in an increase in the possibility of inundation by a mudflow, seiche, tsunami, or sea level rise (Significant).

The creation of the harbor basin would increase the possibility of inundation by a seiche or tsunami adjacent to the basin. A seiche is a seismically generated water wave in a lake or bay and a tsunami is a seismically generated water wave resulting from large terrestrial displacements adjacent to or beneath open water. A seiche could form within the harbor basin due to one or

more factors, often including meteorological effects (atmospheric pressure or winds), seismic activity, landslides into the basin, or tsunamis.

Seismic waves of 20 feet in height are anticipated at the entrance to San Francisco Bay on a 200 year recurrence interval and are expected to decrease to 10 feet at the Richmond-San Rafael Bridge (Ritter and Dupre, 1972). A six or seven foot tsunami wave would be expected at the project site. Wave heights of three feet or more have occurred within San Francisco Bay (Topozada et al., 1992). A seismic wave that originates in the harbor basin could produce a substantially higher wave because of the steeply dipping boundaries, depth, and size (Seidelman, 2007). Also, a rock slope failure starting from the sides of the Quarry or South Hill after inundation could initiate large waves. The risk of a mudflow would be low, because all steep slopes within the project site would have extensive revegetation.

Due to global climate change, sea level is expected to rise one to three feet by 2100 (IPCC, 2007). Rising sea level would raise the highest tides and increase the potential height of seismic-wave run-up (Seidelman, 2007). Rising sea level could affect future development at the project site, potentially resulting in inundation of the lowest-lying areas; this would also be a significant effect.

The Marin Countywide Plan Update Air Quality and Climate Element includes:

Policy AIR-5.2 Prepare Response Strategies for Impacts: Prepare appropriate response strategies that aid systems in adapting to climate change based on sound scientific understanding of the potential impacts. Implementing programs include the following:

AIR-5.c: Prepare Response Strategies. In coordination with the California Coastal Commission, the Bay Conservation and Development Commission, water districts, wildlife agencies, and flood control districts, prepare response strategies for Marin's human and natural systems. Current response strategies include the following...:

Built Environment: Assess development located in coastal areas that are subject to sea level rise and increased flooding, and develop a response strategy, such as a planned retreat program, for the relocation of facilities in low-lying areas. Work with the County flood control and water districts to prepare a plan for responding to a potential rise in the sea level, consider developing flood control projects, and amend County Code Chapters 11, 22, 23, and 24 to include construction standards for areas potentially subject to increased flooding from a rise in sea level.

AIR-5.i Modify Construction Standards. Amend the Marin County Code to include construction standards for areas threatened by future sea level rise. The risk of inundation of developed areas from tsunami, seiche, or sea level rise would be a significant impact.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.5-8: Prior to implementation of Phase 4 reclamation, the Quarry shall model effects of the maximum expected tsunami, seiche event, and anticipated sea level rise, considering the latest climate change information, and county policies and regulations in effect at the time, and proposed adequate setback and final contour elevations in a report to the County. A revised Phase 4 reclamation plan shall be submitted as appropriate.

Mitigation Monitoring and Reporting

The Marin County Department of Public Works will be responsible for reviewing the modeling report and, if required, reviewing and approving the revised Phase 4 reclamation plan to backfill the Main Quarry Bowl.

Level of Significance after Mitigation

The implementation of Mitigation Measure R4.5-8 would reduce the impact to less than significant.

Impact R4.5-9: Filling the Main Quarry Bowl with waters of the San Francisco Bay could cause localized flooding hazards (Less than Significant).

Any flooding and inundation of the Quarry, SE Quadrant, would not extend beyond the Quarry boundaries or exacerbate flooding or increase the flooding potential elsewhere. Additionally, the brow of the Quarry would be at +10 feet above msl. This height would be sufficient to prevent flooding within the area adjacent to the harbor basin. Therefore, there is no increased risk of flooding due to the proposed project.

Mitigation: None required.

Impact R4.5-10: Post-reclamation development could produce stormwater runoff that would result in a degradation of surface water quality (Significant).

This analysis considers the suitability for post-reclamation development, but does not consider any specific development plan. The proposed grading and other earthwork activities included in the proposed project would be designed such that all potential development areas would be located on consolidated fill or bedrock. This would reduce the potential for any impacts to groundwater during future development. However, stormwater runoff could carry sediments and other pollutants into surface water bodies, potentially resulting in a significant impact due to degradation of surface water quality.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.5-10: The applicant shall submit a revised ARP that includes standards for preventing polluted stormwater runoff from entering the Main Quarry Bowl after it is flooded. The standards will be used to guide development of the final Development Plan, due to be submitted three years prior to the anticipated completion of mining.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.5-10: The Marin County Public Works Department will be responsible for reviewing the revised ARP for completeness prior to project approval.

Level of Significance after Mitigation

The implementation Mitigation Measure R4.5-10 would reduce this impact to a less than significant level.

Impacts of the Amended Surface Mining and Quarrying Permit

Potential impacts of the Amended Surface Mining and Quarrying Permit to hydrology and water quality were examined in the San Rafael Rock Quarry Amended Surface Mining and Quarrying Permit Initial Study and determined to be less than significant.

Cumulative Impacts

Please refer to Chapter 5, Growth-Inducing and Cumulative Effects, for consideration of all applicable cumulative impacts to hydrology and water quality.

References – Hydrology and Water Quality

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4.6 Land Use and Planning

Introduction

This section describes existing land uses in the project vicinity and considers the compatibility of the proposed Amended Reclamation Plan (ARP) and Amended Surface Mining and Quarrying Permit (AQP) with neighboring land uses; and their consistency with relevant land use plans, policies, and zoning regulations. The project site is located in unincorporated Marin County adjacent to City of San Rafael neighborhoods, and is within the city's planning area and sphere of influence (SOI). Therefore, this section reviews applicable plans and policies of both the recently-adopted Marin Countywide Plan Update and the City of San Rafael General Plan.

Note on Policy Consistency

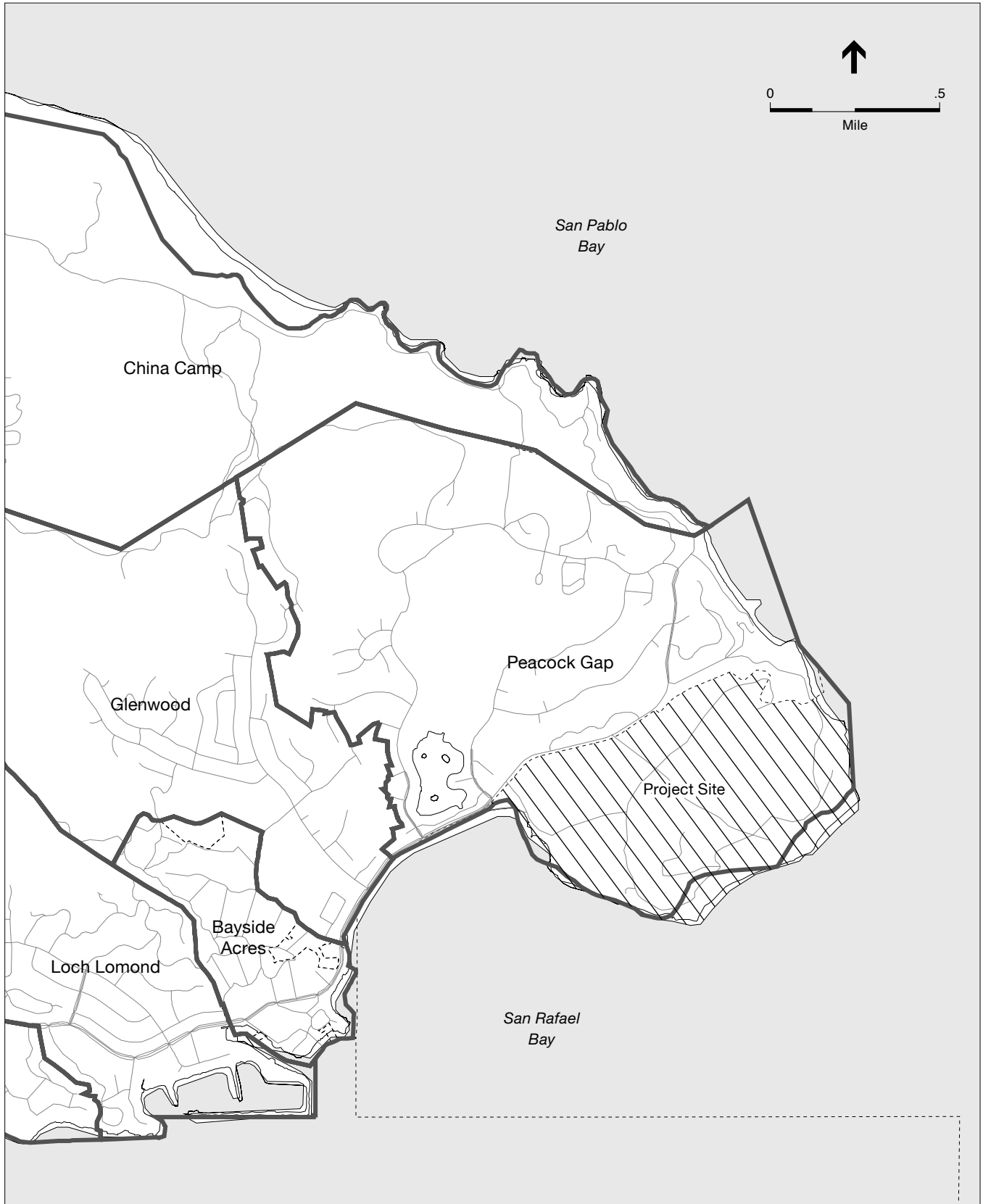
The determinations of policy consistency as discussed in this section represent County staff interpretation of policies. However, this Environmental Impact Report (EIR) does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

Policy inconsistencies may not necessarily indicate significant environmental effects. California Environmental Quality Act Guidelines (CEQA *Guidelines*) §15358(b) state that "effects analyzed under CEQA must be related to a physical change in the environment." Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, the discussion includes mitigation measures to reduce or eliminate the impact. Mitigation measures are addressed further in the relevant topical impact sections.

Setting

Existing Land Uses

Land uses at the project site include active quarrying conducted by the site owner, San Rafael Rock Quarry (SRRQ), and brick and concrete block manufacturing, conducted by site lessees, Marin Exposed Aggregate Company and McNear Brick Company. Apart from the Quarry site itself, residential and park/open space land uses predominate in the project vicinity. The residential land uses are located north and west of the Quarry in the City of San Rafael and pockets of unincorporated County land. The site is within the City of San Rafael planning area and is located in the lower portion of the city's Peacock Gap Neighborhood. North of the project site, the Peacock Gap Neighborhood includes single family homes and condominiums and a private, 18-hole golf course. Other residential areas west of Peacock Gap include the Glenwood, Bayside Acres, and Loch Lomond neighborhoods (see Figure 4.6-1). These neighborhoods consist primarily of single family homes on hillside lots or along San Rafael Bay. The



SOURCE: City of San Rafael General Plan, 2004

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Figure 4.6-1
Neighborhoods in the
Project Vicinity

Loch Lomond Neighborhood also includes a marina and neighborhood shopping center. Land uses in the site vicinity are shown in Figure 4.6-2.

The nearest residences to the project site are the single-family homes ~~and condominiums~~ of the Marin Bay Park development within the Peacock Gap Neighborhood. This development is located immediately north of Cantera Way (the entrance road to McNear's Beach County Park) near the site's northern boundary. Other nearby residences include the ~~single-family homes~~ condominiums along Heritage Drive, and the single-family homes on San Marino Drive and on single-family homes and condominiums along Chapel Cove Drive, north of Point San Pedro Road opposite the Quarry site.

McNear's Beach County Park abuts the northeastern corner of the Quarry property. The park includes picnic areas, tennis courts, a swimming pool, and a 500-foot long fishing pier. China Camp State Park is located north of McNear's Beach County Park and the Peacock Gap Neighborhood. China Camp includes hiking trails that overlook Peacock Gap, the Quarry site, and San Pablo and San Francisco Bays.

Nearby land uses along the waterfront include a public walkway/bikeway that extends along Point San Pedro Road and San Rafael Bay south of the Quarry property, and the Loch Lomond marina. Waterside uses in the site vicinity include commuter ferries, shipping, recreational boating, and other water-oriented recreational uses. The islands of the Marin Islands National Wildlife Refuge, located a little more than a mile southwest of the Quarry, are closed to the public.

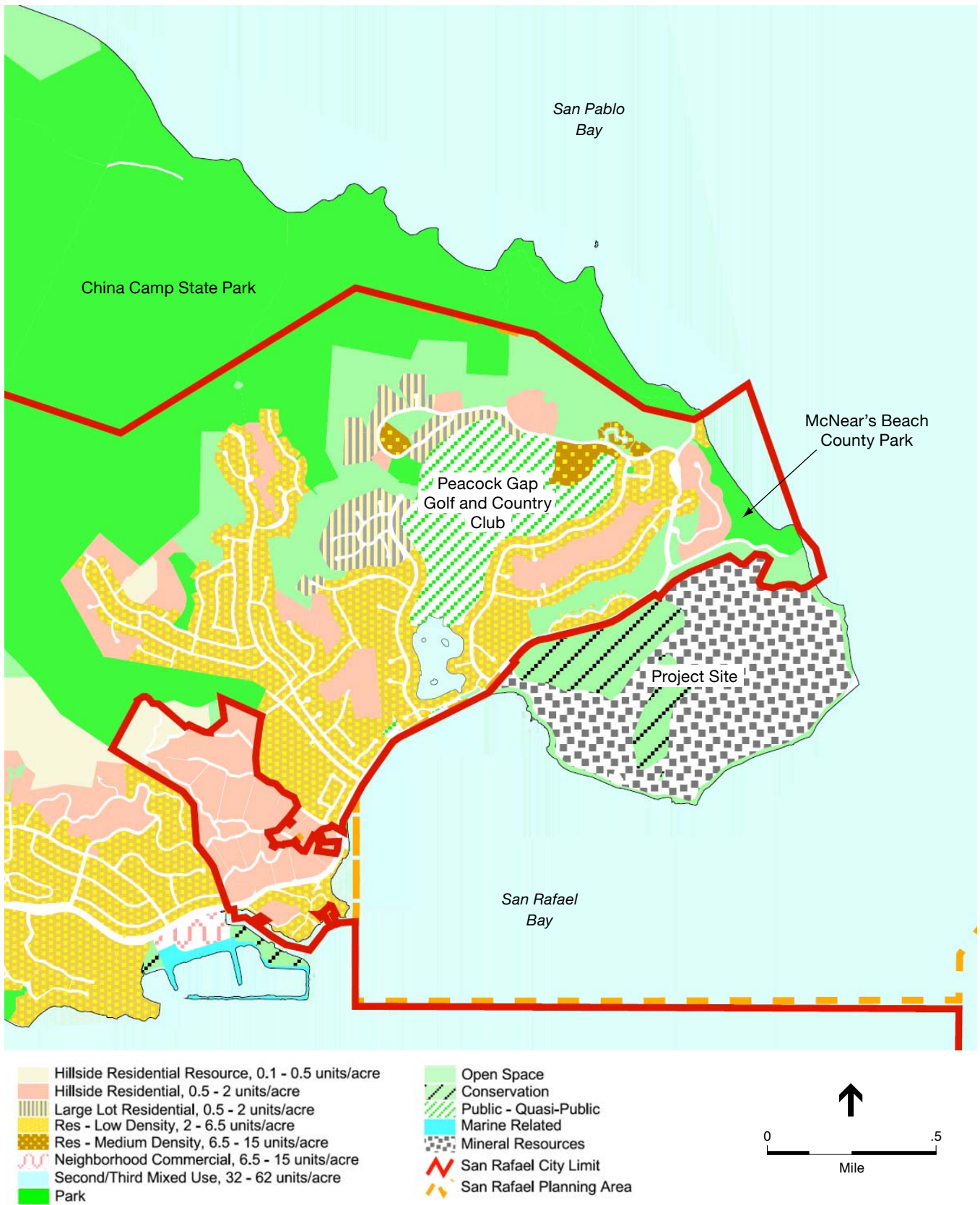
Applicable Plans and Policies

The site is located in unincorporated Marin County but within the City of San Rafael sphere of influence. This section describes relevant policies of the County's current General Plan, the Marin Countywide Plan Update (adopted November, 2007), and of the City of San Rafael General Plan (adopted in 2004).

Peacock Gap Neighborhood Plan (Marin County)

In 1980 the City of San Rafael adopted a neighborhood plan for the Peacock Gap Neighborhood, including the Quarry site. This plan was adopted the following year by the County Board of Supervisors with two exceptions: (1) development densities and (2) provisions for residential screening at a parcel adjacent to SRRQ.

In 2004, the City adopted a new General Plan, which includes a Neighborhoods Element, and rescinded the 1980 Peacock Gap Neighborhood Plan (Resolution 11665). The Neighborhoods Element supersedes the 1980 Peacock Gap Neighborhood Plan and the other neighborhood plans that had been adopted around the same time. Relevant policies of the City's 2004 General Plan, including the Neighborhoods Element, are presented under "The San Rafael General Plan," below. For Marin County, the adopted Countywide Plan Update supersedes the Peacock Gap Neighborhood Plan. As an implementing procedure of the Countywide Plan Update, as for all community and neighborhood plans, the Peacock Gap Neighborhood Plan is subject to review and revision for consistency with the Countywide Plan Update.



SOURCE: City of San Rafael General Plan, 2004

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.6-2
Land Uses in the
Project Vicinity

The Marin Countywide Plan Update (2007)

In November, 2007, the Board of Supervisors adopted the Marin Countywide Plan Update. The Countywide Plan Update is the principal governing general plan for unincorporated areas of the County; it establishes goals, policies, and programs that govern existing and future land uses and development in unincorporated areas.

The Countywide Plan Update divides the County into several major planning corridors: City Centered, Inland-Rural, Coastal Recreation, and Baylands. The Baylands Corridor provides heightened recognition of the unique environmental characteristics of the Baylands area and the need to protect its important resources. The Quarry site is located within the City-Centered Corridor of the Countywide Plan Update. A portion of the site in the NW Quadrant is also within the Baylands Corridor. The area within the Baylands Corridor coincides with the marsh area in the NW Quadrant. As noted in Table 4.6-1, with the incorporation of mitigation measures specified in this EIR, the conceptual proposal for post reclamation development, as well as proposed ARP reclamation activities and mining operations under the proposed AQP appear to be consistent with the Countywide Plan Update 2007 Baylands Corridor policies, including setback requirements. The Baylands Corridor policies do not generally limit any actions proposed in the AQP, ARP, or post-reclamation site development, though to ensure policy consistency, the EIR specifies several mitigation measures.

The Countywide Plan Update Built Environment Element includes Planning Area Policy 3.2, which pertains to the project site, and which is reproduced here:

PA-3.2 Designate Land Use in Point San Pedro. Lands at the Point San Pedro Quarry shall be designated for mineral resource conservation during the period the quarry continues to operate. Applications for an updated quarry reclamation plan and updated quarry permit are currently pending. The quarry site shall also be designated Planned Designation-Reclamation Area in recognition of its potential future conversion to residential, marina, recreational, commercial, or similar uses consistent with the updated Quarry Reclamation Plan. Because the site is located within the sphere of influence for the City of San Rafael, the City will be provided the opportunity to annex the property and conduct future land use approvals. If the site remains subject to County jurisdiction, in order to comprehensively plan for alternative uses and provide a forum for public participation, a specific or master plan will be required to determine residential densities, commercial floor area, and habitat protection areas. No changes in density or land use intensities are proposed prior to approval of a specific or master plan. In order not to exceed current traffic levels, which include truck and other vehicle trips generated by quarry activity, the total number of dwelling units, or their equivalent in commercial or other uses, shall not exceed 75 dwelling units unless otherwise determined by a County-approved traffic study.

Map Set 3-34, Land Use Policy Maps, of the Built Environment Element of the Countywide Plan Update, includes Map 3.2, Point San Pedro Land Use Policy Map, which is reproduced here as Figure 4.6-3. The entire site is designated as MR (Mineral Resources Area) and PD: Reclamation (Planned Designation: Reclamation Area) for its post-reclamation use. Both these designations are shown on a single map which does not show specific designations for post-reclamation

residential, commercial, mixed, harbor, open space, and Bayfront Conservation Zone uses. The entire land area of the site is shown as “PD” and a small area on the eastern edge of the site is shown as open space. The Planned Designation: Reclamation Area indicates 75 units, and notes that, “in order not to exceed current traffic levels, which include truck or vehicle trips generated by quarry activity, the total number of dwelling units, or their equivalent in commercial or other uses, shall not exceed 75 dwelling units unless determined by a County approved traffic study.”

Sustainability principles

As part of the development of the new plan, the Sustainability Working Group in 2001 produced 10 Interim Guiding Principles (“Sustainability Principles”) to help guide the development of the plan (Marin County Sustainability Working Group, 2001). The draft Plan does not yet have the force of adopted County policy; however the Sustainability Principles are being used to guide development. The following four Sustainability Principles are relevant to the project:

2. Use finite and renewable resources efficiently and effectively.

We will reduce consumption and reuse and recycle resources. We will reduce waste by optimizing the full life cycle of products and processes.

Examples of Community Indicators: Per capita waste produced and recycled; per capita use of energy, natural gas, and water; ecological footprint (measures per capita consumption of natural resources).

3. Reduce the release of hazardous materials.

We will make continual progress toward eliminating the release of substances that cause damage to living systems. We will strive to prevent environmentally-caused diseases.

Examples of Community Indicators: Water and air quality; measurements of toxic levels; childhood cancer rates.

4. Steward our natural and agricultural assets.

We will continue to protect open space and wilderness, and enhance habitats and biodiversity. We will protect and support agricultural lands and activities and provide markets for fresh, locally grown food.

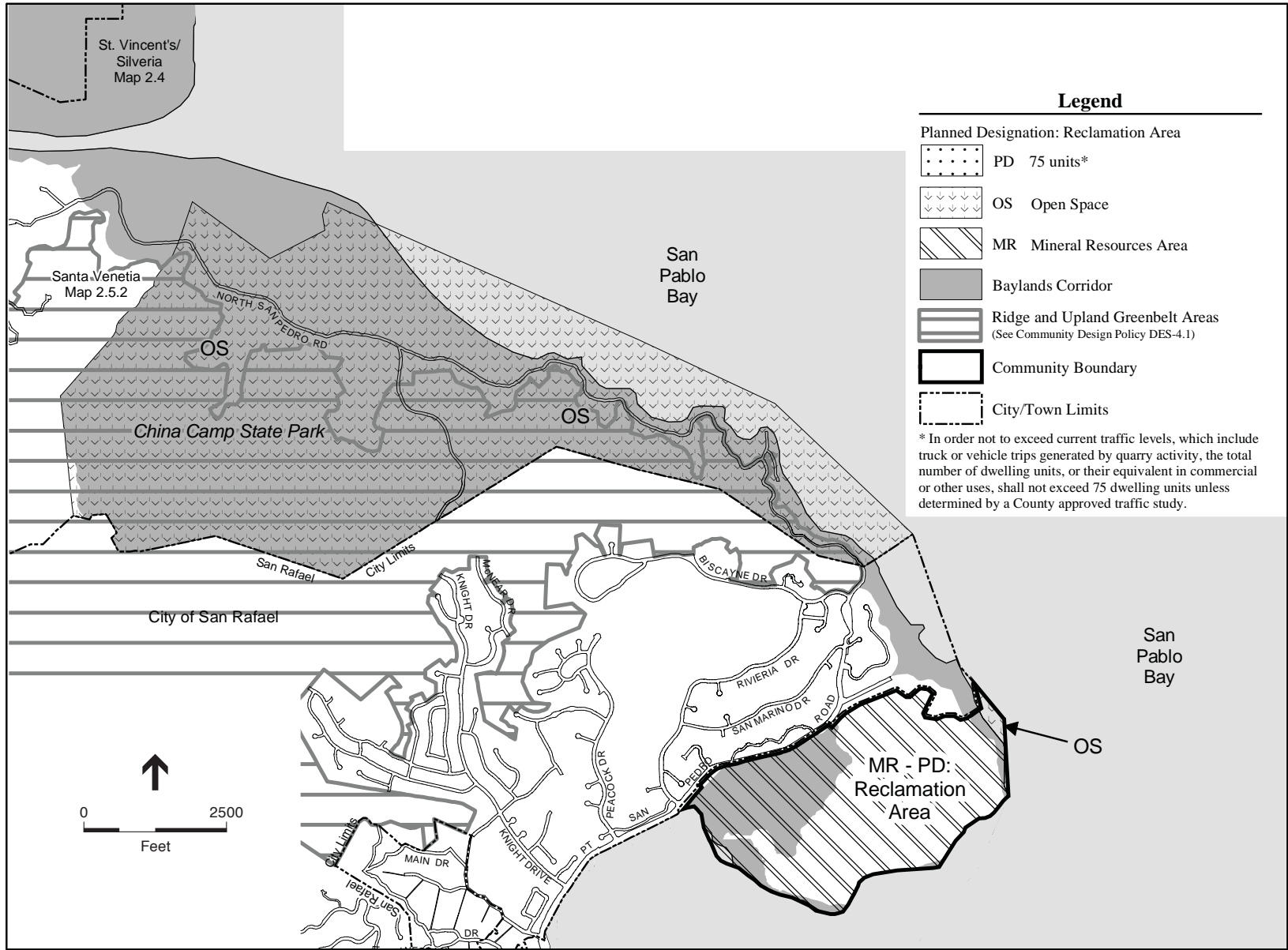
Examples of Community Indicators: Acres of wilderness; acres of protected land; level of fish populations; track special status plants and animals, quantity of topsoil active farmland by crop; productivity of acreage and crop value of agricultural land; acres of organic farmland.

10. Support public health, safety, and social justice.

We will live in healthy, safe communities and provide equal access to amenities and services. We will particularly protect and nurture our children, our elders, and the more vulnerable members of our community.

Examples of Community Indicators: Income statistics; health statistics; percent of uninsured (medical population); longevity after retirement; volunteerism; crime rate; percent of philanthropic contributions.

Other Sustainability Principles that would apply to post-reclamation development of the project site are included in the **Appendix M** for informational purposes.



SOURCE: Marin County Community Development Agency

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Figure 4.6-3
Countywide Plan Update Map 3.2:
Point San Pedro Land Use Policy Map

Consistency of the Projects with Marin Countywide Plan Update Policies

Table 4.6-1 lists relevant policies of the Marin Countywide Plan and provides a preliminary analysis of the consistency of the AQP and ARP projects with each policy. The table refers the reader to the corresponding impact discussion for further analysis of potential inconsistencies and mitigation measures. As previously noted, the determinations of policy consistency as discussed in this section represent County staff interpretation of policies. However, this EIR does not determine policy consistency. The County decision-makers make the formal policy consistency determinations.

The San Rafael General Plan

Although the Quarry is located in unincorporated Marin County, it is within the city's planning area and its sphere of influence as established by agreement between the City and the Marin Local Agency Formation Commission (LAFCO).

General Plan Land Use Designations

The City of San Rafael General Plan 2020 Land Use Map designates areas that correspond to the marsh and pond areas in the NW Quadrant and the South Hill ridge within the Quarry site as "conservation," a narrow band around the entire water-side boundary of the site as "open space," and the rest of the Quarry site as "mineral resources." Adjacent areas are designated on the Land Use Map as follows: The strip of land between the Quarry property line and Cantera Road is designated "open space;" McNear's Beach County Park is designated "park;" the nearest residential areas, north of Cantera Road in the Marin Bay Park development and across Point San Pedro Road, along Heritage, San Marino, and Riviera drives, are designated Hillside Residential, 0.5-2 units/acre and Residential Low Density, 2-6.5 units/acre; there also is an area designated as open space along the hillside between Heritage Drive and the residences on San Marino Drive.

The site is within the Peacock Gap Neighborhood of the San Rafael General Plan. The Quarry site is located within the San Rafael Planning Area but outside the Urban Service Area (the boundary of which coincides with Point San Pedro Road along the site's northern border) in the San Rafael Planning Area and Urban Service Area map (Exhibit 1) of the Land Use Element. The site is within the Central San Rafael sub-area of the General Plan (Exhibit 2 of the Land Use Element). To identify appropriate development intensities, the Land Use Element assigns floor area ratios (FARs)¹ to commercial and industrial areas (while noting that the maximum allowable FARs are not guaranteed). The Quarry site has a designated FAR of 0.02, except for areas corresponding to the marshes and process water pond and the South Hill ridge, which do not have a FAR designation.

According to Exhibit 7 of the Land Use Element, *Building Height Limits in Central San Rafael*, Building Heights in the areas associated with the marshes, pond, and South Hill ridge are 30 feet, and 36 feet for the rest of the site.

¹ The San Rafael Land Use element defines the floor area ratio (FAR) as the total gross building square footage divided by the land area, exclusive of public streets. Parking areas and non-leasable covered atriums are not included in calculating FARs.

**TABLE 4.6-1
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS**

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
<i>Marin Countywide Plan Update Policies</i>		
<i>Biological Resources Policies of the Marin Countywide Plan Update</i>		
BIO-1.1 Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Nursery Areas and Movement Corridors	Consistent with incorporation of mitigation measures. See Section 4.3, Biological Resources, Impacts and Mitigation Measures R4.3-2, R4.3-3, R4.3-5, R4.3-8, R4.3-9, R4.3-10a, and Impact R4.3-12.	Consistent with the incorporation of mitigation measures. See Impacts and Mitigation Measures P4.3-13, P4.3-14, and P4.3-16.
BIO-1.3 Protect Woodlands, Forests and Tree Resources.	Consistent with incorporation of mitigation measures. See impact R4.3-4 in the Section 4.3, Biological Resources.	Consistent. See discussion of ARP with this policy.
BIO-1.4 Support Vegetation and Wildlife Disease Management Programs; BIO-1.5 Promote Use of Native Plant Species; BIO-1.6 Control Spread of Invasive Exotic Plants; BIO-1.7 Remove Invasive Exotic Plants; BIO-1.8 Restrict Use of Herbicides, Insecticides, and Similar Materials; and BIO-1.9 Control Spread of Non-Native Invasive Animal Species.	Consistent. The ARP calls for revegetation of the site with native and non-native, non-noxious species. See the Biological Resources section.	Consistent. As stated in Section 4.3, Biological Resources, the AQP is not expected to result in the introduction of new plant or animal species at the Quarry.
BIO-2.1 Include Resource Preservation in Environmental Review.	Consistent. This EIR considers the impact of the ARP on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors; and require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and function. See Section 4.3, Biological Resources.	Consistent. This EIR considers the impact of the AQP on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors; and require adequate mitigation measures for ensuring the protection of any sensitive resources and achieving "no net loss" of sensitive habitat acreage, values, and function
BIO-2.2 Limit Development Impacts.	Consistent with incorporation of mitigation measures. See discussion under BIO-2.1	Consistent with incorporation of mitigation measures. See discussion under BIO-2.1
BIO-2.3 Preserve Ecotones.	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1
BIO-2.4 Protect Wildlife Nursery Areas and Movement Corridors.	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1
BIO-2.5 Restrict Disturbance in Sensitive Habitat During Nesting Season.	Consistent with incorporation of mitigation measures. See Section 4.3, Biological Resources, Impact R4.3-11.	Consistent with incorporation of mitigation measures. See Impact 4.3-15 in Section 4.3, Biological Resources regarding potential effects of the AQP on special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge.

**TABLE 4.6-1 (continued)
 RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS**

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
BIO-2.7 Protect Sensitive Coastal Habitat.	Consistent with the incorporation of mitigation measures. See Impact R4.3-7, regarding potential impacts of developing the Main Quarry Bowl into a marina. The ARP is consistent with this policy in regards to other sensitive coastal habitat, with incorporation of mitigation measures. See Impact R4.3-6 Section 4.3, Biological Resources.	Consistent with incorporation of mitigation measures. See Impact 4.3-15 in the Biological Resources Section regarding potential effects of the AQP on special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge.
BIO-2.8 Coordinate with Trustee Agencies.	Consistent. Coordination and consultation are occurring as part of the Environmental Review process.	Consistent. Coordination and consultation are occurring as part of the Environmental Review process.
BIO-2.9 Promote Early Consultation with Other Agencies.	Consistent. Coordination and consultation are occurring as part of the Environmental Review process.	Consistent. Coordination and consultation are occurring as part of the Environmental Review process.
BIO-3.1 Protect Wetlands.	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1.	Consistent with incorporation of mitigation measures. See discussion under BIO-1.1.
BIO-5.1 Protect the Baylands Corridor.	Consistent with incorporation of mitigation measures. See Mitigation Measure R4.3-5b in Section 4.3, Biological Resources	Consistent. The AQP would not result in new development of areas within the Baylands Corridor or within specified setbacks.
BIO-5.2 Limit Development and Access.	Phased reclamation grading appears to be consistent with this policy. Consistency of post-reclamation development of the site with this policy should be determined during review of the final Development Plan for post-reclamation use.	Consistent. The AQP would not result in development of areas not already designated for mining.
BIO-5.3 Leave Tidelands in Their Natural State.	Phased reclamation grading appears to be consistent with this policy. Consistency of post-reclamation development of the site with this policy should be determined during review of the final Development Plan for post-reclamation use.	Consistent. The AQP would not result in development of areas not already designated for mining.
BIO-5.4 Restore Marshlands.	Consistency of post-reclamation development of the site with this policy should be determined during review of the final Development Plan for post-reclamation use.	Consistent with incorporation of mitigation measures. See Mitigation Measure P4.3-17a in Section 4.3, Biological Resources.
BIO-5.7 Limit Access to Wetlands.	Phased reclamation grading appears to be consistent with this policy. Consistency of post-reclamation development of the site with this policy should be determined during review of the final Development Plan for post-reclamation use.	Consistent. The AQP would not result in development of areas not already designated for mining.
BIO-5.8 Control Shoreline Modification.	Phased reclamation grading appears to be consistent with this policy. Consistency of post-reclamation development of the site with this policy should be determined during review of the final Development Plan for post-reclamation use.	Consistent. The AQP would not result in development of areas not already designated for mining.

TABLE 4.6-1 (continued)
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
<i>Water Resources Policies of the Marin Countywide Plan Update</i>		
<u>Watershed Health Policies</u>		
WR-1.1 Protect Watersheds and Aquifer Recharge.	Consistent. As discussed in Section 4.5, Hydrology and Water Quality, the ARP project is not expected to have a significant adverse effect on watersheds, aquifer recharge, or natural drainage systems.	Consistent. As discussed in the Water section of the Initial Study, the AQP project is not expected to have a significant adverse effect on watersheds, aquifer recharge, or natural drainage systems.
WR-1.2 Restore and Enhance Watersheds.	Consistent. No significant watershed areas exist on the project site or drain to the project site.	Consistent. No significant watershed areas exist on the project site or drain to the project site.
WR-1.3 Improve Infiltration.	Consistent. The proposed ARP will not alter site hydrology, compared with the current ARP82.	Consistent. While mining inherently impacts infiltration rates, the proposed project will not alter site hydrology, compared with already-permitted plans and activities for the quarrying operation. See the Water section of the Initial Study prepared for the AQP (Marin County, 2007a).
WR-1.4 Protect Upland Vegetation.	Consistent. The proposed project will not disturb upland vegetation beyond that which is already planned in ARP82. See the Section 4.3, Biological Resources.	Consistent. The proposed project will not disturb upland vegetation beyond that which is already planned in the Quarry's existing, approved Surface Mining and Quarrying Permit and Amended Reclamation Plan. See Section 4.3, Biological Resources.
<u>Clean Water Policies</u>		
WR-2.1 Reduce Toxic Runoff; WR-2.2 Reduce Pathogen, Sediment, and Nutrient Levels, and WR-2.3 Avoid Erosion and Sedimentation.	Consistent. Section 4.5, Hydrology and Water Quality finds the Quarry's Stormwater Management Plan and standards for reclamation grading are sufficient to prevent contaminated runoff from entering natural waterways or wetlands.	Consistent. The Water section of the Initial Study (Marin County, 2007a) finds that the Quarry's Stormwater Management Plan eliminates contaminated runoff from entering natural waterways or wetlands.
<i>Environmental Hazards Policies of the Draft Marin Countywide Plan Update</i>		
EH-2.1 Avoid Hazard Areas.	Consistent with incorporation of mitigation measures. See Impacts and Mitigation Measures R4.4-1 and R4.4-3 in Section 4.4, Geology, Soils, and Seismicity.	Consistent. The Initial Study prepared for the AQP (Marin County, 2007a) indicates that the AQP would not result in increased potential hazards from earthquakes and unstable ground conditions.
EH-2.4 Protect Coastal Areas from Tsunamis.	Consistent with incorporation of mitigation measures. See Impact and Mitigation Measure R4.5-8 in Section 4.5, Hydrology and Air Quality Geology, Soils, and Seismicity .	Consistent. See discussion in the Geophysical section of the Initial Study prepared for the AQP (Marin County, 2007a).

TABLE 4.6-1 (continued)
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
<i>Atmosphere and Climate Policies of the Marin Countywide Plan Update</i>		
AIR-1.1 Coordinate Planning and Evaluation Efforts	Consistent. The EIR process has involved coordinated planning and evaluation efforts with relevant agencies, including the BAAQMD.	Consistent. The EIR process has involved coordinated planning and evaluation efforts with relevant agencies, including the BAAQMD.
AIR-1.3 Require Mitigation of Air Quality Impacts	Consistent. See mitigation measures specified in Section 4.2, Air Quality.	Consistent. See mitigation measures specified in Section 4.2, Air Quality.
AIR-2.1 Buffer Emission Sources and Sensitive Land Uses.	Consistent. The ARP does not seek to locate a new land use that could cause a policy inconsistency.	Consistent. The AQP does not seek to locate a new land use that could cause a policy inconsistency.
AIR-4.1 Reduce Greenhouse Gas Emissions.	Consistent with the incorporation of mitigation measures. See Impacts and Mitigation Measures R4.2-3 and R4.2-5 in Section 4.2, Air Quality.	Consistent with the incorporation of mitigation measures. See Impacts and Mitigation Measures P4.2-7 in Section 4.2, Air Quality.
AIR-4.2 Foster the Absorption of Greenhouse Gases.	Consistent with the incorporation of mitigation measures. See Impacts and Mitigation Measures R4.2-3 and R4.2-5 in Section 4.2, Air Quality.	Consistent with the incorporation of mitigation measures. See Impacts and Mitigation Measures P4.2-7 in Section 4.2, Air Quality.
AIR-5.2 Prepare Response Strategies for (climate change) Impacts.	Consistent with incorporation of mitigation measures. See Impact and Mitigation Measure R4.5-8 in Section 4.5 Hydrology and Air Quality Geology, Soils, and Seismicity .	Consistent. Proposed operations under the AQP would not be affected by climate change.
<i>Community Development Policies of the Marin Countywide Plan Update</i>		
CD-1.1. Direct Land Use to Appropriate Areas	Consistent. The project site is within the City-Centered Corridor adjacent to existing residential neighborhoods. Several areas within the site are within the designated Bayfront Conservation Zone. The proposed ARP04 would prepare the site for post-reclamation residential, commercial, marina and open space uses consistent with the policy of concentrating urban development within the City Centered Corridor and consistent with the previously approved ARP82. The proposed ARP04 identifies marsh areas in the northern quadrants as areas to be preserved, consistent with the location of these areas within the Bayfront Conservation Zone within the City-Centered Corridor.	Consistent. As described in Section 4.6, Land Use and Planning, the Quarry is a legal, non-conforming use of the project site.

TABLE 4.6-1 (continued)
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
CD-1.2. Direct Urban Services	Consistent. Although the site is currently outside San Rafael's Urban Services boundary, the site is served by water, power, wastewater, and related urban services. Considering the site's proximity to San Rafael and that its annexation was foreseen the City's previous Peacock Neighborhood Plan and is anticipated in the Neighborhoods Element of the City's current General Plan 2020, ARP04 would be consistent with this policy.	Consistent. The AQP neither demands nor provides additional urban services.
CD-2.3. Establish a Housing Overlay Designation	Consistent. Most of the site is within the Housing Overlay Designation. Post reclamation uses anticipated in ARP04 include single-family and multi-family residences, although some areas of the SRRQ site are designated for other uses or as protected areas.	Not applicable.
CD-4.1. Update Community Plans	Consistent. The site is within the San Rafael Basin community plan area of the Countywide Plan. The community plan recognizes the site's current use as a mineral resources area and its potential post-reclamation planned development uses.	Consistent. The site is within the San Rafael Basin community plan area of the Countywide Plan. The community plan recognizes the site's current use as a mineral resources area and its potential post-reclamation planned development uses.
CD-5.1. Coordinate Service Provision Countywide	Consistent. County and City of San Rafael plans address the potential future annexation of the site by San Rafael to meet post-reclamation site development. The ARP would prepare the site for post-reclamation redevelopment.	Not applicable.
CD-6.1. Coordinate Urban Fringe Planning	Consistent. The site is included in the San Rafael's former Peacock Gap Neighborhood Plan and current Neighborhoods Element policies address the future annexation of the site following the conclusion of quarrying operations.	Consistent. The site is included in the San Rafael's former Peacock Gap Neighborhood Plan and current Neighborhoods Element policies address the future annexation of the site following the conclusion of quarrying operations.
CD-8.1. Establish Land Use Plan Map Designations	Consistent. The site's designation as MR-PD Reclamation addresses both its current use as a quarry and planned development following site reclamation.	Consistent. The site's designation as MR-PD Reclamation addresses both its current use as a quarry and planned development following site reclamation.
CD-8.3. Establish Land Use Intensity Standards	Consistent. No structures are proposed during the four reclamation phases proposed in ARP04, although ARP04 would prepare the site for future land uses that would include residential and commercial uses. The Development Plan to be submitted three years prior to the cessation of quarrying activities would include specifics on post-reclamation land uses.	Not applicable.

**TABLE 4.6-1 (continued)
 RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS**

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
CD-8.8. Establish Planned Designation Land Use Categories	Consistent. The site is designated as MR – PD-Reclamation in recognition of its current use and to plan for post-reclamation redevelopment. Quarrying would continue throughout most phases of the ARP, consistent with the MR-designation, and ARP04 would allow for post-reclamation development with the Planned Designation.	Consistent. The site is designated as MR – PD-Reclamation in recognition of its current use and to plan for post-reclamation redevelopment
<i>Design Policies of the Marin Countywide Plan Update</i>		
DES-4.1 Preserve Visual Quality.	Consistent. As described in Section 4.1, Aesthetics, the ARP is not expected to have significant adverse effects on visual resources.	Consistent with incorporation of mitigation measures. As described in Impact P4.1-9 in Section 4.1, Aesthetics, the proposed project could result in additional nighttime light and glare related to proposed nighttime operations. Mitigation Measure P4.1-9 would reduce this impact to less than significant and ensure policy consistency
DES-5.1 Achieve Streetscape Compatibility.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
<i>Energy and Green Building Policies of the Marin Countywide Plan Update</i>		
EN-1.1 Adopt Energy Efficiency Standards.	Consistent with incorporation of mitigation measures. Mitigation Measure R4.2-2b in Section 4.2, Air Quality, would require efficiency and other measures to off-set greenhouse gas emissions. Mitigation Measure R4.2-5 would require that the final Development Plan, which would be submitted three years prior to the cessation of quarrying activities, would include specifics on energy efficiency and GHG reduction.	Consistent with incorporation of mitigation measures. Mitigation Measure P4.2-6 and P4.2-7 in Section 4.2, Air Quality, would require efficiency and other measures to off-set emissions of criteria pollutants and greenhouse gases.
<i>Mineral Resources Policies of the Marin Countywide Plan Update</i>		
MIN-1.1 Preserve Mineral Resource Sites	Consistent. The ARP does not involve development of incompatible land uses while the Quarry is operating.	Consistent. The continued use of the site for mining operations is consistent with this policy.
MIN-1.3 Buffer Extraction Areas and Incompatible Land Uses	See discussion in Impact 4.6-4.	See discussion under EQ-2.82, above.
MIN-1.4 Require Best Available Management Practices	This CEQA review by the County of the proposed ARP04 reviews proposed site practices and would ensure through identified mitigation measures, as necessary, that best management practices are employed for site reclamation activities.	Consistent with incorporation of mitigation measures. The proposed AQP includes practices that are consistent with this policy. Additional mitigation measures identified in this EIR would further ensure that best management practices would be implemented through the AQP to minimize adverse impacts of the proposed Quarry operation.

TABLE 4.6-1 (continued)
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
MIN-1.5 Reclaim Mined Lands	The Quarry has an approved reclamation plan (ARP82); this EIR evaluates the proposed Amended Reclamation Plan, ARP04.	Consistent. ARP04 is currently being considered for approval.
MIN-1.6 Address Operational Issues	This EIR considers the environmental impacts of the operations associated with implementation of the proposed Amended Reclamation Plan. Site operations approved under the current mining permit and ARP82 are considered part of the environmental baseline for this environmental analysis, as described in Chapter 3, Project Description.	Consistent. The County is preparing this EIR as part of the agreed-to permitting process to amend the Quarry's operating permit and to evaluate the potential environmental impacts of the proposed changes to the AQP, and such amendment is subject to CEQA.
<i>Housing Policies of the Marin Countywide Plan Update</i>		
HS-3.1 House Local Workers.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
HS-3.2 Require Contributions for Workforce Housing from Nonresidential Uses.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
HS-3.6 Provide a Variety of Housing Choices.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
HS-3.12 Designate Transit-Oriented Development Locations.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
HS-3.14 Promote Mixed-Use Housing.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
HS-3.19 Follow an Inclusionary Housing Approach	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
<i>Transportation Policies of the Marin Countywide Plan Update</i>		
TR-1.2 Maintain Service Standards.	Consistent. The ARP will not affect service standards. Concerning post-reclamation development of the site, consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Consistent. As the AQP does not propose an increase in quarry-related traffic, it will not affect service standards.

**TABLE 4.6-1 (continued)
 RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS**

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
TR-1.4 Share the Costs for Improvements.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site	Consistent. The AQP does not propose new development.
TR-1.5 Require Necessary Transportation Improvements.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
TR-3.1 Encourage and Support the Expansion of Local Bus and Ferry Services.	Consistent. The ARP cites the development of a ferry landing at the site as a post-reclamation use. It is anticipated that public transportation to serve the post-reclamation residential and commercial uses of the site will be considered in the final Development Plan.	Not applicable.
TR-3.3 Develop Mixed-Use Intermodal Hubs.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
TR-4.2 Recycle and Conserve Energy.	Consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Not applicable.
<i>Noise Policies of the Marin Countywide Plan Update</i>		
NO-1.2 Minimize Transportation Noise.	Consistent. The ARP does not propose substantial new vehicle trips that could add to transportation noise. Regarding post-reclamation development of the site, consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Consistent. Impact P4.7-5 in the Noise section of this EIR determines that noise from continued operations under the proposed AQP, including transportation, would not exceed established acceptable levels.
NO-1.3 Regulate Noise Generating Activities.	Consistent. See Impact R4.7-1 in Section 4.7, Noise. Regarding post-reclamation development of the site, consistency with this policy should be determined at the time of submittal of the final Development Plan for post-reclamation use of the site.	Consistent with incorporation of mitigation measures. Impact P4.7- 7 in Section 4.7, Noise, determines that vibration noise from continued operations under the proposed AQP would continue to cause annoyance and distress to neighbors of the Quarry. Mitigation Measure P4.7-7 would mitigate this impact to less than significant.
<i>Planning Areas Policies of the Marin Countywide Plan Update</i>		
PA-3.2 Designate Land Use in Point San Pedro	Consistent. ARP04, evaluated in this EIR, is the “updated Quarry Reclamation Plan” referenced in this policy; it is consistent with the Quarry’s current use as a mineral resource area and the potential conversion of the site to residential, marina, and commercial or similar uses.	Consistent. Since the AQP proposes to continue Quarry operations at the site it is consistent with this aspect of the PA-3.2 land use designation at Point San Pedro.

TABLE 4.6-1 (continued)
RELEVANT POLICIES OF THE MARIN COUNTYWIDE PLAN AND CONSISTENCY WITH THE AQP AND ARP PROJECTS

Plan/Element/Policy	Project Consistency: ARP	Project Consistency: AQP
San Rafael General Plan 2020 Policies		
CD-5. Views.	Consistent. With specified mitigation measures, the ARP is not expected to impact views or aesthetic resources of the area to a significant extent.	Consistent. The proposed project does not alter views of the stated visual resources, beyond what would occur under existing permits. See Section 4.1, Aesthetics.
CD-19. Lighting	Consistent. The ARP is not expected to result in new sources of light or glare.	Consistent with incorporation of mitigation measures. Under the AQP nighttime activities could introduce a new source of night and glare. Impact P4.1-9 in Section 4.1, Aesthetics examines this issue. Mitigation Measure P4.1-9 would reduce this impact to less than significant and ensure policy consistency.
LU-23. Land Use Map and Categories	Consistent. Post-reclamation development of the site specified in the ARP is consistent with the land use categories mapped for the site.	Consistent. In proposing continuation of quarrying activities at the site, the proposed AQP is consistent with the Land Use Map designation of the site as a mineral resources land use category that includes quarrying.
NH-143. San Rafael Rock Quarry and McNear Brickworks	Consistent. Post-reclamation development of the site specified in the ARP appears to be generally consistent with the details of this policy. The City of San Rafael is participating as a responsible agency in the CEQA process.	Consistent. The project evaluated in this EIR is the proposed continuation of Quarry operations and revision of the Quarry's permit, a possibility envisioned in this policy. The City of San Rafael is participating as a responsible agency in the CEQA process.
NH-143a. Rock Quarry Plan; NH-144. San Rafael Rock Quarry Impacts; NH-144a. Rock Quarry Impacts; and LU-7a. Development Adjacent to San Rafael.	Consistent. The County is preparing this EIR to review SRRQ's proposed Amended Reclamation Plan, to evaluate potential environmental impacts associated with the project and to identify measures to reduce those impacts. The City of San Rafael is participating as a responsible agency in these CEQA processes, consistent with these policies.	Consistent. The County is preparing this EIR as part of the permitting process, to evaluate the potential environmental impacts of the proposed changes to the AQP, and will require that the Quarry operations implement best management practices and implement mitigation measures identified in this document to minimize or avoid hazards and adverse environmental impacts associated with the proposal. The City of San Rafael is participating as a responsible agency in these CEQA processes, consistent with these policies.
NH-145. Point San Pedro Road Widening	Consistent. The ARP would not preclude widening of Point San Pedro Road.	Consistent. The project is consistent with this policy insofar as it would not preclude the widening of Point San Pedro Road as anticipated in this policy, although coordination with Quarry operators would be needed to mitigate impacts associated with Quarry traffic during road construction.
NH-146. San Rafael Rock Quarry Shoreline Use	Consistent with the implementation of mitigation measures. See Impact R4.6-34, below, and Mitigation Measures R4.6-34a, b, c <u>and</u> d.	Consistent. The proposed AQP is consistent with the policy because implementation of the proposed AQP would not preclude or interfere with the post-reclamation development of a park band as envisioned in this policy.

Neighborhoods Element: Peacock Gap Neighborhood

The Neighborhoods Element of the San Rafael General Plan 2020, adopted in 2004, “merges the best parts of the existing neighborhood plans in order to create general policies applicable to all San Rafael neighborhoods while at the same time creating specific policies for each neighborhood” (City of San Rafael, 2004; Marin County, 2006). The Neighborhoods Element includes policies concerning the Peacock Gap Neighborhood, and supersedes the 1980 Peacock Gap Neighborhood Plan. Please note that the Neighborhoods Element provides that future density should be based on a traffic study to determine road capacity at the time post reclamation development is considered. Apparent consistency of the AQP and ARP projects with these and other San Rafael General Plan 2020 policies is shown in Table 4.6-1.

Marin County Code

Title 22 – Development Code

The County Development Code is the primary tool to carry out the goals, objectives, and policies of the Marin Countywide Plan and applicable community and specific plans, and is intended to be consistent with the Marin Countywide Plan.

Article II - Zoning Districts and Allowable Land Uses

The site is zoned Residential Multiple Planned Commercial (RMPC), and is considered a legal, nonconforming use. The site previously had been zoned M-2 (Heavy Industrial) and was rezoned to RMPC at the time of the approval (1982) of the currently approved Amended Reclamation Plan (ARP82) to allow the eventual implementation of the ARP.

Chapter 22.16, Planned Districts

Chapter 22.16, Planned District Development Standards, provide development standards for sites within the RMPC district and other planned districts. The purpose of the planned district standards is to allow for varied types of land uses to be designed without the confines of specific yard requirements, where amenities resulting from flexibility of design will benefit the public welfare or other properties in the community, in a manner that will implement the policies of the Marin Countywide Plan.

Chapter 22.112 Nonconforming Structures, Uses, and Parcels

Chapter 22.122 provides uniform provisions for the regulation of legal nonconforming structures, land uses, and parcels. It states that within the zoning districts established by the County’s Development Code, there exist structures, land uses, and parcels that were lawful prior to the adoption or amendment of the Development Code, but would be prohibited, regulated, or restricted differently under the terms of the current development code. The intent of the Development Code is to discourage the long-term continuance of nonconformities, but to permit them to exist under limited conditions.

22.112.020 Restrictions on Nonconforming Uses and Structures.

Nonconforming uses ... may continue, subject to the following provisions:

A. Nonconforming uses of land. A nonconforming use of land may be continued, transferred or sold, provided that the use shall not be enlarged, increased, or intensified (e.g., longer hours of operation, more employees, etc.), nor be extended to occupy a greater area than it lawfully occupied prior to becoming a nonconforming use. The nonconforming use may not be relocated to another location on the parcel, or moved from the inside to an outside location.

Title 23 – Natural Resources

Chapter 23.06-Regulation and Control of Surface Mining and Quarrying Operations

Marin County’s Surface Mining and Quarry Ordinance contains the following provisions related to land use:

23.06.010 Purpose.

The provisions of this chapter are intended to insure the continued availability of important mineral resources, while regulating and controlling surface mining and quarrying operations for the purposes enumerated in Chapter 23.02 of this title. In addition, the provisions of this chapter are intended to insure that all areas of lands affected by such operations shall be reclaimed, i.e., rehabilitated or restored to as nearly a natural appearance as possible, to be compatible with surrounding properties or for other contemporary uses.

23.06.050 Land reclamation requirements [in part]

Application for a site approval or reclamation plan for surface mining or land reclamation projects shall be made on forms approved by the Marin County public works department.... Unless otherwise specified in the use permit or surface mining and quarry permit, reclamation shall be done in the following manner:

- (1) Grading required under the approved reclamation plan shall be carried out as soon as practicable.
- (2) Grading shall be carried out to provide a surface as nearly natural appearing as possible, or to provide a surface consistent with the land use objectives stated in the approved reclamation plan. In all cases, grading shall be done in such a manner as to minimize erosion.
- (3) Within ninety days of termination of the actual rock or mineral production, all structures, metal, lumber or other debris resulting from the operation, are to be removed or buried. Such burial is subject to the provisions of the reclamation plan, requirements of the California Environmental Quality Act and approval of the director of public works. If specified in the reclamation plan, a structure or materials may be retained on the site for the stated land use objective anticipated after completion of the operation, subject to the approval of the director of public works.

Other Applicable Plans and Policies

Surface Mining and Reclamation Act

The primary state law concerning conservation and development of mineral resources is the California Surface Mining and Reclamation Act (SMARA) of 1975, as amended to date. SMARA is found in the California Public Resources Code (PRC), Division 2, Chapter 9, Sections 2710, et seq.. SMARA was enacted in 1975 to limit new development in areas with significant mineral deposits. SMARA calls for the state geologist to classify the lands within California based on

mineral resource availability. In addition, the California Health and Safety Code requires the covering, filling, or fencing of abandoned shafts, pits and excavations (California Health and Safety Code Sections 24400-03).

SMARA sets state policy for the reclamation of mined lands. SMARA states that the extraction of minerals is essential to the continued economic well-being of the State and to the needs of society, and that reclamation of mined lands is necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. The reclamation of mined lands will permit the continued mining of minerals and will provide for the protection and subsequent beneficial use of the mined and reclaimed land. Surface mining takes place in diverse areas where the geologic, topographic, climatic, biological, and social conditions are significantly different, and reclamation operations and the specifications therefore may vary accordingly (California Public Resources Code Section 2711).

The regulations set forth in SMARA are to be used as standards by the lead agencies which can include cities, counties, the San Francisco Bay Conservation and Development Commission, or the board itself. The lead agency shall have principal responsibility for approving surface mining operation or reclamation plans which include grading, backfilling, resoiling, revegetation, soil compaction, erosion control, and other reclamation requirements.

Office of Mine Reclamation

Created in 1991 to administer the Surface Mining and Reclamation Act of 1975 (SMARA). Established to meet the Act's requirement, OMR provides assistance to cities, counties, state agencies and mine operators for reclamation planning and promotes cost-effective reclamation. OMR strives to reclaim mined lands to a beneficial end-use through the implementation of SMARA, prevent or minimize the adverse environmental effects of mining by providing assistance to lead agencies and miners in the review of reclamation plans, and minimize residual hazards to public health and safety through the Abandoned Mine Lands program.

Marin County Surface Mining and Quarrying Operations Ordinance

Marin County's Surface Mining and Quarrying Ordinance is contained in Chapter 23.06 of the Marin County Code. The Ordinance includes measures that pertain to reclamation of surface mining and quarrying operations. The following applies to reclamation plans:

23.06.050 Land Reclamation Requirements

Application for a site approval or reclamation plan for surface mining or land reclamation projects shall be made on forms approved by the Marin County public works department. The application shall be filed in accord with this chapter and procedures to be established by the public works director. The forms for reclamation plan applications shall require, at a minimum, each of the elements required by Surface Mining and Reclamation Act and state regulations, and any other requirements deemed necessary to facilitate an expeditious and fair evaluation of the proposed reclamation plan, to be established at the discretion of the lead agency. As many copies of the site approval application as may be required by the lead agency shall be submitted to the lead agency. Copies of the site approval application

will be forwarded to the State Department of Conservation for comments and to the Marin County department of public works. The Department of Conservation will be allowed thirty days to conduct a review of the site approval application in addition to the county review period.

Unless otherwise specified in the use permit or surface mining and quarry permit, reclamation shall be done in the following manner:

- (1) Grading required under the approved reclamation plan shall be carried out as soon as practicable.
- (2) Grading shall be carried out to provide a surface as nearly natural appearing as possible, or to provide a surface consistent with the land use objectives stated in the approved reclamation plan. In all cases, grading shall be done in such a manner as to minimize erosion.
- (3) Within ninety days of termination of the actual rock or mineral production, all structures, metal, lumber or other debris resulting from the operation, are to be removed or buried. Such burial is subject to the provisions of the reclamation plan, requirements of the California Environmental Quality Act and approval of the director of public works. If specified in the reclamation plan, a structure or materials may be retained on the site for the stated land use objective anticipated after completion of the operation, subject to the approval of the director of public works.
- (4) Earth dams may be constructed wherever the formation of lakes for water impoundment does not interfere with the operations or damage adjoining property and is in conformance with the land use objectives in the reclamation plan.
- (5) Grading shall be carried out so as to cover, with at least two feet of overburden or other relatively inert natural rock materials, any acid forming or other toxic materials which are exposed by the operations. Such burial is subject to the requirements of the California Environmental Quality Act.
- (6) All other parts of the reclamation plan are to be completed concurrently with the grading or as soon as practicable after completion of the grading specified in the plan. (Ord. 3301 §4, 1999; Ord. 1844 §2 (part), 1971)

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction over development within 100 feet of the line of highest tidal action or the Bay shoreline within San Francisco Bay and Suisun Marsh. BCDC was created by the McAteer-Petris Act of 1965 and charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared. The *San Francisco Bay Plan* (Bay Plan), which was completed in January 1969 (and amended periodically since then), includes policies on the use of the Bay ranging from ports and public access to design and transportation. Bay Plan policies encourage new shoreline development to provide public access to the Bay, to the maximum extent feasible. BCDC is responsible for ensuring that development within the 100-

foot shoreline band² is consistent with the Bay Plan. BCDC is also the federally-designated state coastal management agency for the San Francisco Bay segment of the California coastal zone.

The Bay Plan incorporates a series of Bay Plan Maps of specific areas along the shoreline. These maps are based on and show how to apply Bay Plan policies. The SRRQ site is within Bay Plan Map No. 4 (Central Bay North), which designates the northern half of the site's shoreline (and contiguous portions of McNear's Beach County Park as well as China Camp State Park) as Waterfront Park, Beach. The map designates a "scenic drive" bisecting the site (in the approximate location of the site's current main entrance road) and Point San Pedro Road along the site's northern boundary is also designated as a scenic drive. ARP04 proposes no changes to the mitigation identified in ARP82 that "conformance with BCDC will be accomplished when quarrying is exhausted and development of the site is proposed. The Master Plan of Development [of post-reclamation land uses] shall fully conform with all applicable BCDC plans and policies." ARP04 also states (Part 2, B.8) that "[t]he [BCDC] has jurisdiction over a 100' wide band along the shoreline of the SRRQ site. Appropriate uses and setbacks in this area will be incorporated into the final Development Plan for the SRRQ site." The 100-foot shoreline band would be subject to approval by Bed's Design Review Board, to ensure compatibility with policies for public access, appearance, design, and scenic views.

The following Bay Plan public access policies are particularly relevant to the Post-reclamation use of the project site:

Public Access Policy 2. In addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, wildlife area, or other use, except in cases where public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including unavoidable, significant adverse effects on Bay natural resources. In these cases, in lieu access at another location preferably close to the project should be provided.

Public Access Policy 4. Public access should be sited, designed and managed to prevent significant adverse effects on wildlife.

Public Access Policy 5. Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed. This should be done wherever appropriate by requiring dedication of fee title or easements at no cost to the public, in the same manner that streets, park sites, and school site are dedicated to the public as part of the subdivision process in cities and counties.

² As provided in the San Francisco Bay Plan, the "shoreline band" within Bed's jurisdiction consists of all territory located between the shoreline of the Bay and a line 100 feet landward of and parallel with that line [with specified exceptions]. It generally includes tidelands, which are lands lying between mean high tide and mean low tide, and marshlands lying between mean high tide and five feet above mean sea level (BCDC, 2006).

Public Access Policy 6. Public access improvements provided as a condition of any approval should be consistent with the project and the physical environment, including protection of Bay natural resources, such as aquatic life, wildlife and plant communities and provide for the public's safety and convenience.

Public Access Policy 7. In some areas, a small amount of fill may be allowed if the fill is necessary and is the minimum absolutely required to develop the project in accordance with the Commission's public access requirements.

San Francisco Bay Trail Plan

In July 1989, the Association of Bay Area Governments (ABAG) adopted the *San Francisco Bay Trail Plan* to guide the development of a regional hiking and bicycling trail around the perimeter of San Francisco and San Pablo Bays. The Plan was prepared pursuant to Senate Bill 100, which mandated that the Bay Trail provide connections to existing park and recreation facilities, create links to existing and proposed transportation facilities, and be planned in such a way as to avoid adverse effects on environmentally sensitive areas. The Plan includes a proposed alignment and set of policies and strategies for its design, implementation and financing (ABAG, 2006). As shown on the San Francisco Bay Trail map for Marin, the trail follows Point San Pedro Road south of and adjacent to the SRRQ site, and continues within China Camp State Park a short distance from North San Pedro Road. The map also shows a section of "Planned Bay Trail: Future route - not developed" following the shoreline within the SRRQ site itself (ABAG, nod.). Relevant Bay Trail Plan policies include the following:

Trail Alignment Policy 1. Ensure a feasible, continuous trail around the Bay.

Trail Alignment Policy 2. Minimize impacts on and conflicts with sensitive environments.

Trail Alignment Policy 3. Locate trail, where feasible, close to the shoreline.

Trail Alignment Policy 4. Provide a wide variety of views along the Bay and recognize exceptional landscapes.

Trail Alignment Policy 6. In selecting a route for the trail, incorporate local agency alignments where shoreline trail routes have been approved. Incorporate San Francisco Bay Conservation and Development Commission public access trails where they have been required.

Environmental Protection Policy 26. The path will not always follow the Bay shoreline; inland reaches may be more appropriate, especially for bicycle travel, in some parts of the San Francisco Bay region.

A review of the consistency of the proposed project with the above policies is presented in the Impacts and Mitigation Measures section, below (see Table 4.6-1, at the end of the section).

Impacts and Mitigation Measures

Approach to the Impact Analysis

The determinations of policy consistency as discussed in this EIR section (see Table 4.6-1) represent County staff interpretation of policies. However, this EIR does not determine policy consistency. The formal policy consistency determinations are made by the County decision-makers.

Policy inconsistencies may not necessarily indicate significant environmental effects. CEQA *Guidelines* §15358(b) states that “effects analyzed under CEQA must be related to a physical change in the environment.” Therefore, only those policy inconsistencies that would lead to a significant effect on the physical environment are considered significant impacts pursuant to CEQA. Where potentially significant environmental impacts are raised in the discussion below, mitigation measures are specified to reduce or eliminate the impact. Mitigations are addressed further in the relevant topical impact sections of this chapter.

Where potentially significant environmental impacts have been mitigated to a less-than-significant impact, the project is determined to be consistent with the relevant policies cited.

Significance Criteria

CEQA *Guidelines* Appendix G suggests that the project would have a significant land use impact ~~[ACCORDING TO CEQA GUIDELINES]~~ if it would:

- physically divide an established community;
- conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; and
- conflict with any applicable habitat conservation plan or natural community conservation plan.

Consistent with policy and guidance provided by the County of Marin EIR Guidelines, Appendix N, an effect of the proposed project would be considered significant if it causes one or more of the following impacts:

- calls for a land use that would convert prime agricultural land to nonagricultural use or impair the productivity of prime agricultural land;
- conflicts with County land use goals or policies;
- calls for land uses that would conflict with existing or proposed uses at the periphery of the project area or with other local land use plans;
- results in the conversion of open space to urban- or suburban-scale development; and
- conflicts with local zoning.

Impacts of the Amended Reclamation Plan

Impact R4.6-1: The project would not convert agricultural land to nonagricultural uses or impair the productivity of prime agricultural land (Less than Significant).

The proposed ARP04 would be implemented within the existing SRRQ site, which has been altered by more than 100 years of mining, brick-making, and related activities and does not include any agricultural land. Areas not altered by or used for mining operations are protected areas that are inappropriate for agricultural development (i.e., the marshes in the NW Quadrant and the grove of trees on the north slope of South Hill). The site does not contain any identified agricultural resources and is not encumbered by any Williamson Act contracts. Therefore the project would not convert agricultural land to nonagricultural uses or impair the productivity of prime agricultural land.

Mitigation: None required.

Impact R4.6-2: Proposed post reclamation development of the site would not generally conflict with Bay Conservation and Development Commission and City of San Rafael General Plan policies (Less than Significant).

ARP04 states that post-reclamation development will be undertaken consistent with applicable BCDC policies. However, the site layout as currently depicted (see Figure 3-6 in the Project Description) suggests that the site entrance roadway may occupy a portion of the 100-foot shoreline band under BCDC jurisdiction, in the vicinity of McNear's Brickyard and the marsh areas of the NW quadrant.

Furthermore, the post-reclamation development of the site as currently depicted (Figure 3.6) includes various land uses -- residential, commercial and mixed use, and community facilities -- to the waters edge. This could potentially conflict with BCDC policies, with the San Rafael policy to create a park along the shoreline (part of policy NH-143) depending on the scope and specific location of future development. It should be noted, however, that current post-reclamation land use plans are only conceptual in nature. It is anticipated that more detailed plans will be prepared as part of the final Development Plan, due to be submitted three years prior to the cessation of mining. Consistency with applicable City of San Rafael General Plan and BCDC policies should be determined during review of the final Development Plan.

Mitigation: None required.

Impact R4.6-3: ARP04 would conflict with existing uses at the periphery of the project site as a result of incompatible land uses (Significant).

The Quarry has been located at its existing site for more than one hundred years. However, the adjacent residential neighborhoods have grown in recent decades, and more residences are located in closer proximity to the Quarry site than when ARP82 was approved. ARP04 proposes a substantial change to the implementation of reclamation activities from that proposed in ARP82. Under ARP82, reclamation activities were to be undertaken when quarrying was completed. Under ARP04, reclamation activities are proposed to be implemented in four phases, for 8-10 weeks each year, over the approximately 17-year period the Quarry continues to operate. Reclamation activities include berm construction, material stockpiling, grading, and revegetation of disturbed areas. To limit noise and visual impacts on the nearest residences, SRRQ proposes to construct a berm on the site's northern boundary, just south of Cantera Way and the eucalyptus grove that borders the roadway, during the first reclamation phase. While the berm is expected to reduce the most adverse noise impacts of reclamation activities in the NE quadrant, and noise impacts (except during berm construction) would be within the "normally acceptable" range (as discussed in Section 4.7, Noise and Vibration), noise from equipment and vehicles and their backup alarms are expected to be clearly audible to nearby residences, due to the closer proximity of the reclamation activities.

The County already receives complaints from neighbors of SRRQ bothered by noise, dust, and vibrations from Quarry operations. The penetrating and annoying sound of backup alarms from quarrying activities was noted in comments on the notice of preparation for this EIR. The proposed reclamation activities will bring construction-related activities much closer to the adjacent neighborhoods than most of the current operations. As discussed in Section 4.7, Noise and Vibration, the additional noise from the implementation of reclamation activities concurrent with quarrying activities is expected to be within the "normally acceptable" range as provided in County standards except during berm construction, when these standards are likely to be exceeded temporarily. However, the cumulative effect of the reclamation activities occurring every year for 17 years concurrent with ongoing quarrying activities could have a substantial impact in terms of annoyance to the neighbors of SRRQ, due to the inherent land use incompatibilities.

This anticipated exacerbation of the existing incompatibility of land uses is considered a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.6-3a: As stated in Section 4.7, as a project mitigation, SRRQ proposes to construct a berm along the northern border of the NE Quadrant, and to retrofit all rolling vehicles at the Quarry with broadband backup alarms. Broadband alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), by being 5 dBA quieter than conventional back-up alarms, and by generating noise that has a less intrusive tonal quality.

Mitigation Measures Identified in this Report

Mitigation Measure R4.6-3b: Implement Mitigation Measure R4.7-1b.

Mitigation Measure R4.6-3c: In addition to the requirements of Mitigation Measure R4.7-2, implementation of the following construction noise abatement measures would reduce the annoyance impact of construction and reclamation activity noise.

- The applicant shall limit all reclamation grading activities in the NE Quadrant to 7:00 a.m. to 5:00 p.m. Monday through Friday.
- Equipment and trucks used for all reclamation activities shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds).
- All construction equipment powered by internal combustion engines shall be properly muffled and maintained.
- Unnecessary idling of internal combustion engines shall be prohibited.

Mitigation Measure R4.6-3d. Each year by May 1 and not later than 30 days prior to the commencement of reclamation activities, SRRQ shall inform by mail all residences on Marin Bay Park Court, Heritage Drive, and San Marino Drive, and the public at large of the start date, nature of the work, and expected duration of the 8-10 week period during which reclamation grading activities will occur that year.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.6-3: The Marin County Department of Public Works will monitor implementation of and adherence to Mitigation Measures R4.6-3a, b, c, and d.

Level of Significance after Mitigation

Mitigation Measures R4.6-3a, b, c, and d would enable planned phased reclamation to proceed while minimizing the conflict with surrounding land uses, and would thus reduce this impact to less than significant.

Impact R4.6-4: The project would not result in the conversion of open space to urban- or suburban-scale development (Less than Significant).

The site currently is in active industrial use as a quarry with brick manufacturing and other related industrial uses occurring at the site. Most of the areas of the site that are relatively undisturbed, namely the marsh areas in the NW Quadrant, the grove of eucalyptus trees on the northern slope of south hill, and the line of trees along the northern property boundary, would be retained under ARP04. Therefore, impacts due to the conversion of open space to urban or suburban scale development would be less than significant.

Mitigation: None required.

Impact R4.6-5: Activities associated with the phased implementation of the reclamation plan would conflict with County Code Title 22 (Section 22.112.020) restrictions on nonconforming uses (Significant).

Grading activities proposed to occur during part of every year over the estimated 17 years that quarrying operations continue (under the proposed Amended Surface Mining and Quarrying Permit, which is concurrently being reviewed by the County), in the northern quadrants of the site especially, would constitute an intensification of the existing non-conforming use. Under ARP82, reclamation activities were not planned to occur until quarrying operations had ended. Reclamation grading and site preparation were to take place after cessation of quarrying, within a discrete, limited timeframe. By contrast, ARP04 proposes four reclamation phases involving movement of materials to stockpiles and berms, grading, and revegetation, to occur during the estimated 17-year period that mining operations continue. Reclamation activities are proposed to occur only during the dry season, for 8-10 weeks of each year. Although the grading would occur for only 8-10 weeks each year, it would occur during the time of the year residences would be more inclined to spend time outdoors and more visitors would be expected at McNear's Beach County Park. The cumulative effect of this periodic movement of materials and grading during each dry season for approximately 17 years would be an intensification of activity in the northern quadrants of the site beyond the level in 1982 when the Quarry became a legal nonconforming use. The magnitude of this intensification cannot be precisely quantified due to the lack of detailed quantified information on site activities -- especially in the northern quadrants -- at the time the site became a legal nonconforming use. The environmental effects of this intensification would primarily be air quality impacts from dust (as well as equipment and vehicle emissions) and noise impacts from the operation of vehicles and equipment, especially in the NE Quadrant. These impacts are addressed in Sections 4.2 and 4.7 of this EIR, and annoyance impacts resulting from the incompatibility of reclamation activities with adjacent land uses are addressed in Impact 4.6-4 of this section.

It should be noted that quarrying for brick materials in the brick resource area (NE Quadrant) does not currently take place. In terms of permitted activity levels, the proposed increase in reclamation activities in that quadrant would be offset to some extent by the absence of mining that formerly occurred in the brick resources area; no additional mining of material for brick making is anticipated, as the resource is exhausted.

It is also noted that reuse of mixed overburden and pond fines proposed under ARP04 is consistent with the County's Sustainability Principle 2 to use finite resources efficiently and effectively, to reuse and recycle resources, and to reduce waste. In this case, overburden and pond fines that would otherwise be disposed (either within the Main Quarry Bowl or at an offsite disposal site) would be retained on site for productive uses as engineered foundation material for the post-reclamation development. Nevertheless, the mixing and movement of this material from one quadrant to another for a portion of each year for approximately 17 years, in combination with the ongoing mining activities at the site, would result in an intensification of activity at the

Quarry site compared to current levels and the level of activity at the time the Quarry became a nonconforming use.

Furthermore, the phased reclamation grading called for in ARP04 is more consistent with SMARA than postponing all reclamation to the cessation of quarrying: SMARA requires that reclamation plans demonstrate how "...reclamation can be initiated at the earliest possible time on those portions of the mined lands that will not be subject to further disturbance by the surface mining operation" (SMARA, § 2772(c)(6)).

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.6-5a: ARP04 proposes to limit reclamation grading activities to an 8-10 week period during each dry season.

Mitigation Measures Identified in this Report

Mitigation Measure R4.6-5b: Although the effects of the intensification of site activities resulting from the reclamation plan cannot be precisely quantified, implementation of Mitigation Measure R4.6-3b, above, regarding noise, and measures to control dust currently being implemented, required by existing permits, proposed by the applicant or identified in this EIR as discussed at Impact 4.2-1 and Impact 4.2-2 in Section 4.2, Air Quality, would help reduce the environmental effects of intensified site use on land uses adjacent to the site.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.6-5: Mitigation Measures R4.6-5a and b will become conditions of approval of the ARP; as such, their implementation and effectiveness will be monitored by the Marin County Department of Public Works.

Level of Significance after Mitigation

Given the uncertainties of the precise nature of the use of the site in 1982, and the likelihood that the effects of quarrying on the neighborhood at that time were similar to those anticipated from reclamation activities proposed under ARP04 (and as mitigated herein), Mitigation Measures R4.6-5a and R4.6-5b, along with those cited above, would substantially reduce the significance of this impact, resulting in a less-than-significant impact.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.6-6: The Amended Surface Mining and Quarrying Permit would allow for an intensification of quarry operations beyond 1982 levels, in excess of the Quarry's legal nonconforming use under Title 22 of the County Code (Significant).

The following components of the proposed project would potentially exceed the scope of SRRQ's permitted use of the property as a legal nonconforming use:

- The proposed AQP would impose no limits on annual production of quarry materials, allowing SRRQ to operate at an intensity well beyond that of 1982;
- The proposed AQP would allow for noise-generating operations until 10 p.m. and on weekends. These would include barge loading and operation of the crushing plant. The 1982 Amended Reclamation Plan indicates that, “(n)oise generating operations in both the Quarry and the plant are generally limited to daylight hours on weekdays except in times of emergency (Gilroy, 1982, p. 9).
- The proposed AQP would allow blasting to occur at greater frequency than the “approximately two times per week” frequency extant in 1982 and cited in Salter, 1982 (reference 133 in Section IX).

Mitigation Measures Proposed as Part of the Project

Mitigation Measure P4.6-6a: The applicant proposes to limit daily truck traffic to 250 one-way trips per day (125 in and 125 out). This appears to be less than the daily average during the period 1980-1982.

Mitigation Measures Identified in this Report

Mitigation Measure P4.6-6b: Quarry operations shall be limited to the levels of intensity extant in 1982, at the time that the Quarry became a legal nonconforming use. This will include the following:

- Maximum annual production shall be limited to the level of production in 1982, i.e., 1,473,000 tons per year;
- Operations shall be limited to those in place in 1982, i.e., noise-generating operations will be limited to daylight hours on weekdays, except during a declared emergency;
- Blasting shall be limited to ~~approximately~~ an annual (calendar year) average of two times per week (104 times per year).

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.6-6: The specific requirements of these Mitigation Measures shall become conditions of approval of the AQP. As such, responsibility for monitoring implementation of this mitigation measure shall lie with the Marin County Department of Public Works.

Level of Significance after Mitigation:

The above mitigation measures would ensure that SRRQ is operating within the scope of its permitted use, and would therefore fully mitigate Impact P4.6-6.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

Impact C4.6-7: Continuing operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit and simultaneous phased reclamation grading under the Amended Reclamation Plan would result in continuing incompatibility with neighboring residential and recreational land uses (Significant).

The County has received numerous complaints from residents of the Peacock Gap neighborhood (including Marin Bay Court) regarding noise, blast vibration, dust, soot, and truck traffic from existing mining operations. Such complaints related to site operations provide evidence that current site operations are incompatible with neighboring residential land uses, regardless of whether SRRQ is meeting existing permit and regulatory standards. While any one of these may be a mere annoyance, together and cumulatively they create a fundamental incompatibility between the Quarry and the surrounding land uses, resulting in a significant, cumulative impact. Mitigation Measures P4.6-6a and b, and measures identified in the Section 4.7, Noise and Vibration and Section 4.2, Air Quality, would reduce this impact to the extent feasible. However, given the close proximity of the Quarry to the adjacent residential neighborhoods, no feasible measures appear to be available to reduce the incompatibility of land uses during the estimated 15-17 years of quarry operations and phased reclamation grading under the proposed 2004 Amended Reclamation Plan. Although the Quarry use as a legal non-conforming use in a designated Significant Mineral Resource Area renders the use generally consistent with land use policies, the cumulative considerable physical impacts associated with continued long term land use incompatibilities result in a significant unavoidable cumulative impact. Both the ARP and AQP projects would contribute to a cumulatively considerable extent to this impact.

Mitigation: No additional mitigation has been found to be feasible.

Level of Significance after Mitigation:

Significant and Unavoidable.

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Norman T. Gilroy and Associates. Amended Reclamation Plan for Miners Quarry, Marin County, California. Prepared for Basalt Products, a Division of Dillingham Construction Co. February, 1982.

Salter, Charles M. Assoc. (Consultants in Acoustics), letter report from Richard R. Illingworth, P.E. to Jack Streblow, Executive Vice President, Basalt Products, re: McNear's Quarry, San Rafael, CA – Acoustical Consulting. April 29, 1982.

4.7 Noise and Vibration

This section evaluates the potential for the projects to cause new or more severe noise impacts. This section provides a description of the physical and regulatory setting and examines the potential for the Amended Reclamation Plan (ARP) and the Amended Surface Mining and Quarrying Permit (AQP) to increase noise levels at San Rafael Rock Quarry (SRRQ or Quarry).

Setting

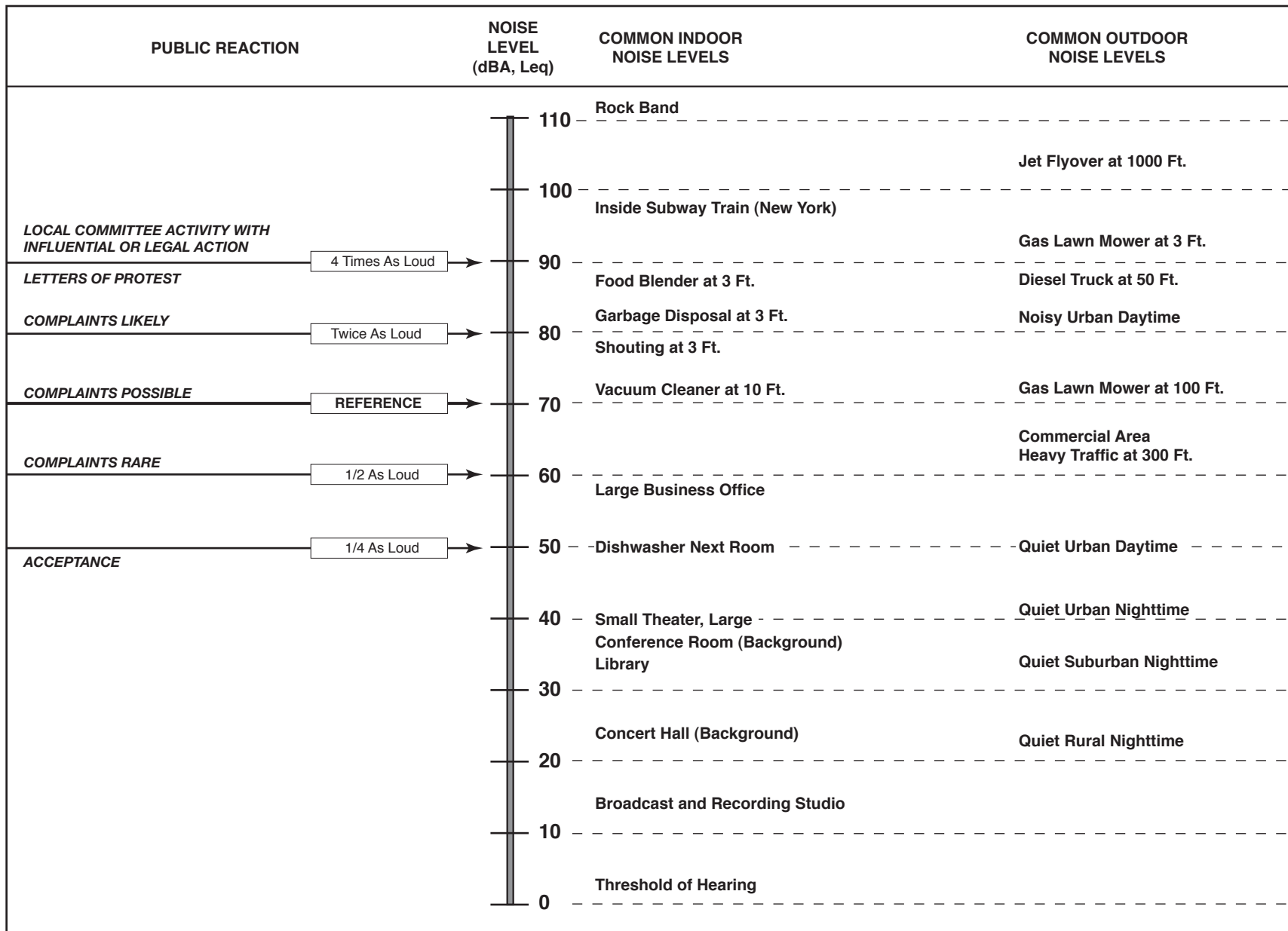
Noise Exposure and Community Noise

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in decibels (dB), a logarithmic loudness scale with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Because sound pressure can vary by over one trillion times within the range of human hearing, the logarithmic loudness scale is used to calculate and manage sound intensity numbers conveniently.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. Therefore, the sound pressure level constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies and greater sensitivity to mid-range frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).¹ Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding noise levels in dBA are shown in Figure 4.7-1.

¹ All noise levels reported herein reflect A-weighted decibels unless otherwise stated.



SOURCE: Caltrans Transportation Laboratory Noise Manual, 1982; and modification by ESA

Figure 4.7-1
Effects of Noise on People

The noise levels presented in Figure 4.7-1 are representative of measured noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. Rather, noise levels vary with time, such that the noise experienced in any one place, or the community noise environment, varies continuously over time. Specifically, community noise is the result of many distant noise sources that constitute a relatively stable background noise exposure where the individual contributors are unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. At the same time, throughout the day, short duration single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens) that are readily identifiable to the individual add to the existing background noise level. The combination of the slowly changing background noise and the single-event noise events give rise to a constantly changing community noise environment.

Given the variation of community noise level from instant-to-instant, community noise levels must be measured over an extended period of time to characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

- L_{eq} : The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
- L_{max} : The instantaneous maximum noise level measured during the measurement period of interest.
- L_x : The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level (i.e., the noise level exceeded 50 percent of the time).
- DNL: The day-night average sound level (DNL, also written as L_{dn}) is the energy average of the A-weighted sound levels occurring during a 24-hour period, accounting for the greater sensitivity of most people to nighttime noise by weighting (“penalizing”) nighttime noise levels by adding 10 dBA to noise between 10:00 p.m. and 7:00 a.m.
- CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA “penalty” for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to the 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, and learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Therefore, an important way of predicting human reaction to a new or changed noise environment is the way the noise levels compare to the existing environment to which one has adapted: the so-called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

The noise level or loudness scale presented in Figure 4.7-1 indicates that noise levels of 50 dBA or less are generally considered acceptable in terms of public reaction. It should be noted that noise levels generated below this level may still be audible, particularly in rural nighttime conditions and that the impulsiveness, tone and/or frequency of low level noise at generally acceptable levels may be subjectively received with an adverse response or annoyance.

The noise experienced at a receptor depends on the distance between the source and the receptor, the presence or absence of noise barriers and other shielding features, and the amount of noise attenuation (lessening) provided by the intervening terrain. For line sources, such as motor or vehicular traffic, noise decreases by about 3.0 to 4.5 dBA for every doubling of the distance from the roadway. For point or stationary sources, such as electric motors, a noise reduction of 6.0 to 7.5 dBA is experienced for each doubling of the distance from the source. Sensitivity to noise also varies according to the individual, the time of day (noise at night is weighted to reflect greater sensitivity), and type of noise (the backfire from an engine [a loud, short duration noise] is often more intrusive than the constant low hum of an engine).

Introduction to Vibration Principles and Descriptors

Vibrations caused by blasting activities can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source, due to spreading of the energy and frictional losses. The energy transmitted through the ground as vibration, if great enough, can result in annoyance or structural damage. Appendix J of this document contains an extensive report on blasting and its effects specific to SRRQ and its environs.

When explosive charges detonate in rock, they are designed so that most of the energy is used in breaking and displacing the rock mass. However, some of the energy can also be released in the form of transient stress waves, which in turn cause temporary ground vibration. Detonating charges also create rock movement and release of high-pressure gas, which in turn induce air-overpressure (noise), airborne dust and audible blast noise.

Standard industry damage criteria and “safe levels” of ground motion are generally based on particle velocity and frequency of motion. The response of humans to ground motion is primarily influenced by ground motion velocity and duration of the motion. Vibration intensity is expressed as Peak Particle Velocity (PPV) or the maximum particle velocity of the ground. Since ground-shaking speeds are generally quite low, it is measured in inches per second (in/s).

Persons not familiar with vibration science often confuse particle velocity values with ground displacement. For instance, if a measured peak or maximum particle velocity is 0.25 inches, the ground has NOT moved a quarter of an inch. The actual temporary particle movement or displacement would be much less because in one second of time ground particles disturbed by blast vibration waves will oscillate back and forth many times in a second. Monitoring indicates that all of the actual temporary ground motions near residential structures caused by blasting at SRRQ have been less than the thickness of a human hair (≈ 0.008 in).

Vibration Perception and Damage Criteria

The average person is quite sensitive to ground motion, and levels as low as 0.50 millimeters per second (mm/s) (equivalent to 0.02 inches per second [in/s]) can be detected by the human body when background noise and vibration levels are low. Vibration intensity is expressed as Peak Particle Velocity (PPV), which is simply the maximum speed that the ground moves while it temporarily shakes. Since ground-shaking speeds are very small, it is measured in inches per second (in/s). Frequency of motion or cycles per second is a measure of how many times a particle of ground moves back and forth (or up and down) in one second of time. Frequency is expressed in units of Hertz (Hz).

Blast Noise (Air-Overpressure)

The term “Blast noise” is misleading because the largest component of blast-induced noise occurs at frequencies below the threshold-of-hearing for humans (16 to 20 Hz). Hence, the common industry term for blast-induced noise is “air-overpressure”. As its name implies, air-overpressure

is a measure of the transient pressure changes. These low-intensity pulsating pressure changes, above and below ambient atmospheric pressure, are manifested in the form of acoustical waves traveling through the air.

When calculating maximum overpressure values, the absolute value of the greatest pressure change is used — regardless of whether it is a positive or negative change. The frequency of the overpressure (noise) is determined by measuring how many up-and-down pressure changes occur in one second of time. Blast noise occurs at a broad range of frequencies and the highest-energy blast noise usually occurs at frequencies below that of human hearing (<20 Hz).

When measurements include low frequency noise (2 Hz and higher) with a flat response, they are called “linear scale” measurements. Air-overpressure measurements are typically expressed in decibels (dB) units and when the scale is linear, the unit designation is “dBL.” Regular acoustical noise measurements taken for the purpose of monitoring compliance with local noise ordinances almost always use weighted scales that discriminate against low frequency noise. Thus for a similar noise source, A-weighted and C-weighted scales will usually record significantly lower levels of noise. Differences between decibel scale measurements for individual blasts will vary depending on their unique frequency-intensity spectrums. Since full-range recording of blast-induced noise can only be done with linear (2-Hz response) instruments, it is imperative that all compliance specifications for blast-induced noise be expressed in “Linear” scale decibels (dBL).

The regulatory limit defined by the U.S. Bureau of Mines (USBM), in State of California regulations, for air-overpressure measured with 2-Hz response seismographs is 133-dBL (0.014 psi). Damage to old or poorly glazed windows does not occur until air-overpressure reaches about 150 dBL. More importantly, since the decibel scale is a logarithmic ratio, the actual overpressure at 150 dBL is 0.092 psi, versus 0.013 psi at 133 dBL. Therefore, the actual pressure at the 133 dBL limit, is less than one-seventh (0.092/0.013) of the threshold damage level at 150 dBL.

Noise Regulations, Plans, and Policies

Marin County Loud and Unnecessary Noises Ordinance

Section 6.70 of the Marin County Code (Loud and Unnecessary Noises), restricts the creation and continuation of loud, unnecessary, or unusual noise. This ordinance, enforced by the County Sheriff’s Department, prohibits excessive noise levels from various sources including motor vehicles, amplification systems, and persons yelling. None of the specific provisions of the Ordinance pertains to normal quarrying operations or traffic noise, other than a prohibition on the unnecessary sounding of vehicle horns and signaling devices.

Marin Countywide Plan Noise Element

The Marin Countywide Plan Update 2007 (General Plan) Noise Element identifies traffic noise as the major source of noise in Unincorporated Marin County. Other significant local noise sources include aircraft, trains, mining activity, and construction (Marin County, 2007).

The Noise Element identifies exterior noise environments which are appropriate for various types of land uses. These are shown in Table 4.7-1. The land uses around SRRQ include residential, open space and recreation, and San Francisco Bay. Table 4.7-1 shows that for low density, single family residential uses, the normally acceptable noise level is less than 60 dB CNEL or L_{dn} ; conditionally acceptable levels are 55-70 dB CNEL or L_{dn} , normally unacceptable levels are 70-75 dB CNEL or L_{dn} , and clearly unacceptable levels are above 75 dB CNEL or L_{dn} . For certain open space uses, including water recreation, the normally acceptable noise level is less than 75 dB CNEL or L_{dn} ; conditionally acceptable levels are 70-80 dB CNEL or L_{dn} , and unacceptable levels are above 80 dB CNEL or L_{dn} . While the CNEL is more restrictive than the LDN because it applies a 5 dBA “penalty” for noise between the hours of 7:00 p.m. and 10:00 p.m., the Countywide Plan makes no specific distinction between the two descriptors for the purposes of characterizing acceptability of a noise environment.

The County has also adopted separate standards for stationary noise sources such as mechanical equipment and industrial facilities (Marin County, 1994). These standards, which are shown in Table 4.7-2, do not constitute an enforceable noise ordinance, but rather provide benchmarks to be used in planning and siting of land uses. The noise levels listed in Table 4.7-2 are standards for noise levels at the property line of the potentially affected land use; nighttime standards apply only when the potentially affected land use operates or is occupied during nighttime hours. Guidelines for application of the Table 4.7-2 standards are included in the Noise Element:

Guidelines for use of Table 4.7-2:

1. The measurements are made at the property line of the receiving land use. The effectiveness of noise mitigation measures should be determined by applying the standards on the receptor side of noise barriers or other property line noise mitigation measures.
2. The nighttime standards apply only when the receiving land use operates or is occupied during nighttime hours.
3. Sound-level measurements to determine maximum level noise shall be made with “slow” meter response.
4. Sound-level measurements for impulsive noise sources shall be made with “fast” meter response. Impulsive noises are defined as those that have sharp, loud peaks in decibel levels but that quickly disappear. Examples include a dog’s bark, a hammer’s bang, and noise with speech or music content.
5. The allowable noise level standard shall be raised to the ambient noise level in areas where the ambient level already exceeds the standards shown in this table. For example, if the neighborhood already experiences daytime hourly noise levels of 60 dBA as an ambient condition, the noise level standard shall be raised to 60 dBA.
6. The allowable noise level shall be reduced 5 dB if the ambient hourly Leq is at least 10 dB lower than the noise-level standard shown in this table. For example, if the neighborhood experiences daytime hourly noise levels of 40 dBA as an ambient condition, the noise level standard shall be lowered to 45 dBA.

The Noise Element notes that the standards in Tables 4.7-1 and 4.7-2 are for purposes of planning and siting land uses. The standards are not a noise ordinance and are not to be used to achieve the same objectives as a noise ordinance. The standards are not to be used for regulating existing noise sources or enforcement concerning noise problems.

Countywide Plan Update 2007 Policies

Consistency of the ARP and AQP with Noise Element policies is discussed in Section 4.6, Land Use and Planning.

U.S. Department of Labor, Mine Safety and Health Administration (MSHA)

The mission of the Mine Safety and Health Administration (MSHA) is to administer the provisions of the Federal Mine Safety and Health Act of 1977 (Mine Act) and to enforce compliance with mandatory safety and health standards as a means to eliminate fatal accidents; to reduce the frequency and severity of nonfatal accidents; to minimize health hazards; and to promote improved safety and health conditions in the Nation's mines. MSHA carries out the mandates of the Mine Act at all mining and mineral processing operations in the United States, regardless of size, number of employees, commodity mined, or method of extraction.

MSHA's new noise standards (1999) require mine operators to monitor workplace noise exposure and provide for miners and their representatives to observe the monitoring. The standards establish several levels requiring mine operators to take action:

- Miners exposed to an average sound level of 85 decibels (85 dBA) or more over an 8-hour period must be enrolled in a hearing protection program, which will include special training, hearing tests, and hearing protection.
- If workplace noise levels reach 90 dBA or more over an 8-hour period, mine operators must use feasible engineering and administrative controls to reduce noise levels. Hearing protectors are required to be provided and worn if the permissible exposure level cannot be achieved using feasible engineering and administrative controls.
- At workplace noise levels of 105 dBA or more over an 8-hour period, mine operators must ensure the use of both ear plug and earmuff type hearing protectors.
- At no time during the work shift may noise levels exceed 115 dBA.

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise and vibration) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise and vibration than are commercial and industrial land uses.

**TABLE 4.7-1
LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS**

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)															
	50	55	60	65	70	75	80									
Residential - Low Density Single Family, Duplex, Mobile Home																
Residential - Multi-Family																
Transient Lodging – Motel/ Hotel																
Schools, Libraries, Churches, Hospitals, Nursing Homes																
Auditorium, Concert Hall, Amphitheaters																
Sports Arena, Outdoor Spectator Sports																
Playgrounds, Neighborhood Parks																
Golf Courses, Riding Stables, Water Recreation, Cemeteries																
Office Buildings, Business, Commercial and Professional																
Industrial, Manufacturing, Utilities, Agriculture																
	<table border="1"> <tr> <td>Normally Acceptable</td> <td>Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.</td> </tr> <tr> <td>Conditionally Acceptable</td> <td>New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.</td> </tr> <tr> <td>Normally Unacceptable</td> <td>New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.</td> </tr> <tr> <td>Clearly Unacceptable</td> <td>New construction or development generally should not be undertaken.</td> </tr> </table>								Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.	Clearly Unacceptable	New construction or development generally should not be undertaken.
Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.															
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.															
Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.															
Clearly Unacceptable	New construction or development generally should not be undertaken.															

SOURCE: Marin Countywide Plan Update, Noise Element

**TABLE 4.7-2
BENCHMARKS FOR ALLOWABLE NOISE EXPOSURE FROM STATIONARY NOISE SOURCES**

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Leq, dB	50	45
Maximum Level, dB	70	65
Maximum Level, dB (Impulsive Noise)	65	60

SOURCE: Marin County, *Marin Countywide Plan Update, Noise Element*, November, 2007, Figure 3-43

The nearest sensitive receptors to the project site include residential uses and recreational site users. The nearest existing residential developments are the residences along Heritage Drive and Marin Bay Park Court. These residences are approximately 200 feet from the fence line of the Quarry and 1,200 feet from the main quarrying area. Portions of McNear's Beach County Park border the fence line and are located approximately 800 feet from the main quarrying area. While set further north of the Quarry, residences on San Marino Drive and Via Montebello also overlook the Quarry at a distance of approximately 1,600 feet from the Quarry operations area.

Noise Monitoring Data

Noise data for the Quarry was accumulated from three different sources. A noise monitoring survey was conducted by Charles Salter Associates in April of 1982 to evaluate the ramifications of lowering North Hill. Long-term fence line noise monitoring has been performed by Vibra-Tech over the past two years for the County of Marin. Additionally, short and long-term noise monitoring was conducted by Environmental Science Associates (ESA) at a number of sensitive receptor locations surrounding the Quarry.

1982 Noise and Vibration Levels

In April of 1982 Charles Salter Associates reported on their analysis of the acoustical ramifications of lowering North Hill. Two 15-minute noise measurements were conducted in the vicinity of homes on San Marino Drive (in 1982 these were the residences closest to the Quarry). These measurements indicated that the predominant noise sources were fog horn warnings of 50 to 60 dBA, Leq and McNear's Brickyard operations of 44 to 60 dBA, Leq. In general noise from the Quarry was reported as not audible from these residences during the daytime monitoring period, with the exception of equipment back up warning alarms. A second measurement conducted when the Quarry was not operating (during the lunch hour) indicated noise levels at these San Marino Drive homes of 44 to 51 dBA, predominated by operations from McNear's Brickyard.

The 1982 study also monitored noise from quarry processing equipment at a distance of 100 feet. The results of this monitoring are shown in Table 4.7-3. The study concluded that the lowering of north hill could result in a substantial increase in noise levels at the homes on San Marino Drive

**TABLE 4.7-3
SRRQ OPERATIONAL EQUIPMENT NOISE EMISSION LEVELS IN 1982**

Equipment	Noise Level (L _{eq}) ^a
Primary Crusher	78
Secondary Crusher	83
Front-end Loader (Caterpillar 988)	80
Asphalt Batch Plant	79
Rock Breaker	90

^a Estimates correspond to a distance of 100 feet from the piece of equipment.

SOURCE: Charles Salter Associates, McNear's Quarry, San Rafael CA., Acoustical Consulting, April 29, 1982.

unless stockpiles were maintained on-site to attenuate noise, including a 15-foot lip at the top of North Hill. This provision was specified as a condition of approval of the 1982 Amended Reclamation Plan, was implemented, and is still in place.

The same study notes that “Blasting at McNear’s Quarry takes place approximately two times a week” (Salter, 1982, p. 4). The noise study references a vibration study by an “independent consultant” in 1980 at a home on San Marino Drive that indicated that “...vibrations generated by blasts range from ‘imperceptible’ to ‘barely perceptible’ and are below human annoyance levels” (*ibid*, p. 4). The original 1980 vibration study could not be located for this analysis.

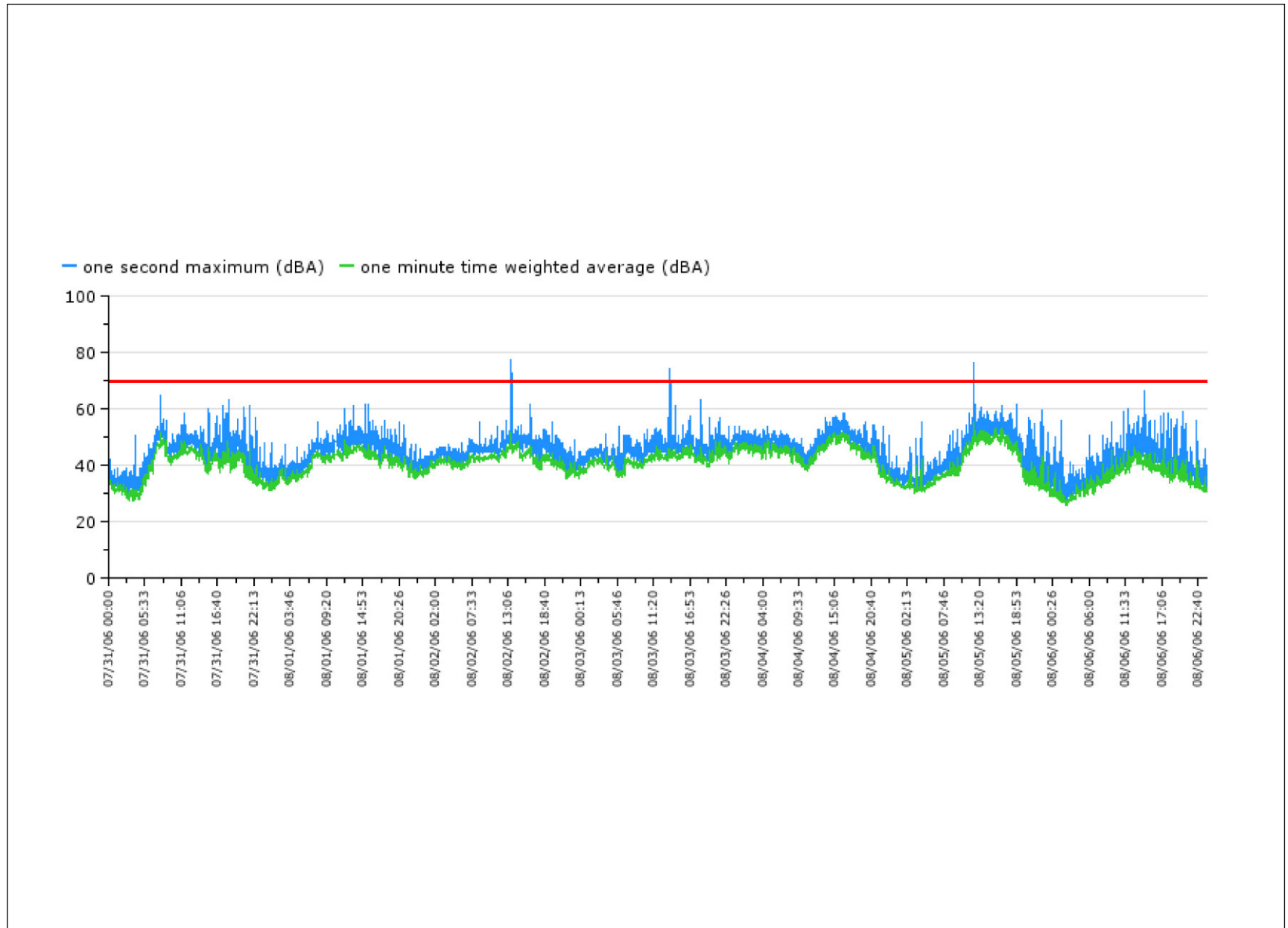
Present San Rafael Rock Quarry Fence Line Monitoring

Noise data have been collected by the County for several years at the Quarry site. Figure 4.7-2 presents one week of the most recent verified data collected by the County during the summer of 2006. The noise monitoring station is located at the Quarry boundary with McNear’s Beach County Park, at a point between the Quarry and the Marin Bay Park residential development. These data indicate that peak daytime noise levels at the fence line of the Quarry are generally below 70 dBA, while nighttime maximum noise levels hover around 40 dBA. One-second average noise level spikes above 70 dBA occurred three times during the week. The County’s records indicate that two of these spikes are attributed to equipment testing, while the third was caused by a jet aircraft passing overhead.

Noise Environment Monitoring at Existing Sensitive Receptors

To establish the existing noise setting of sensitive land uses near the Quarry, independent noise data was collected by ESA as a part of this environmental analysis. Noise monitoring was conducted at six exterior locations during the daytime when activity at the Quarry included excavation, loading of trucks and loading of barges, as well as blasting events at three locations (ST-4, ST-5 and ST-8). Noise monitoring locations are presented in Figure 4.7-3. Table 4.7-4 presents the results of this noise monitoring effort. Noise monitoring records and calculations are presented in Appendix B. It should be noted that noise monitoring conducted by ESA preceded

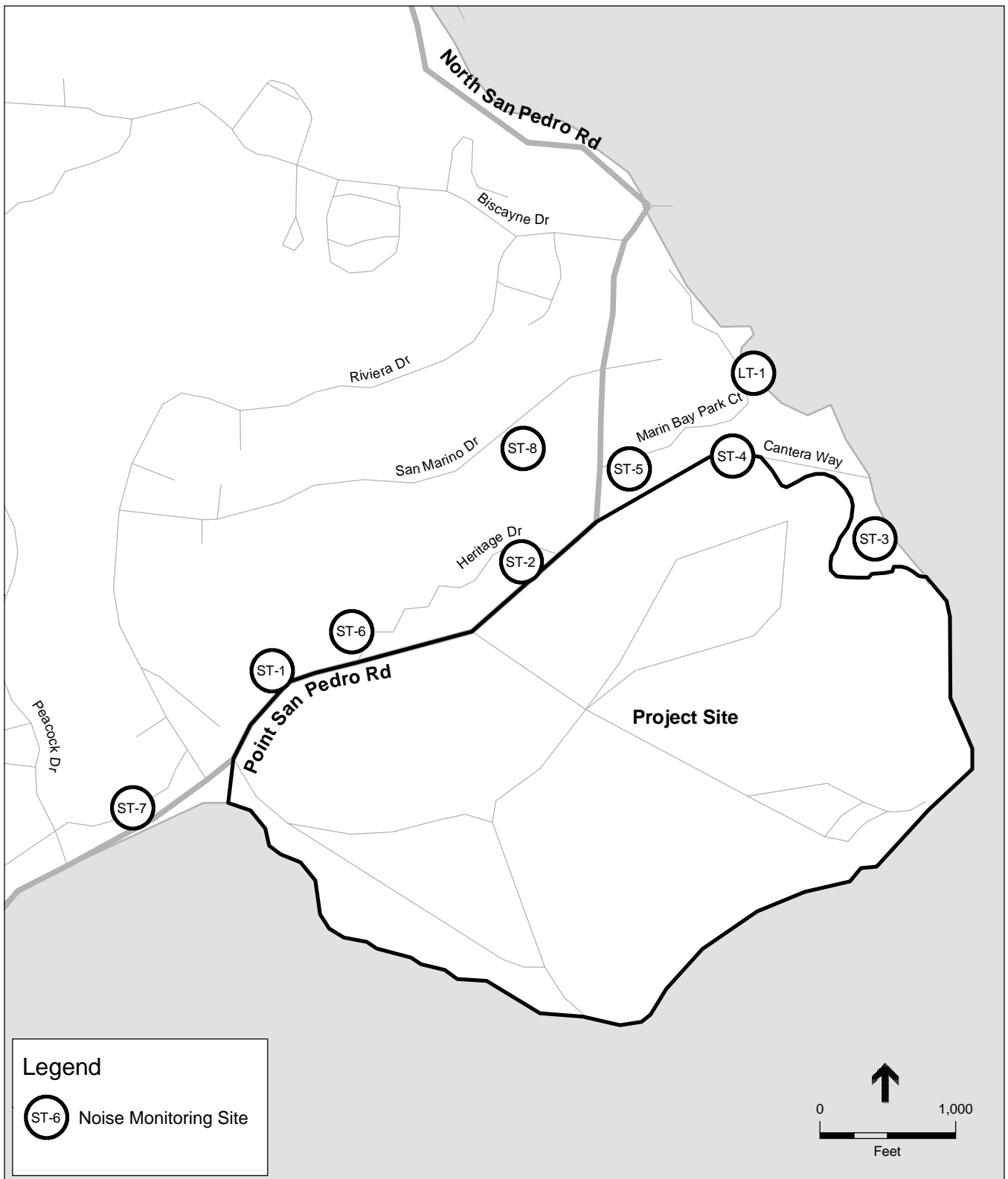
the implementation by the Quarry of several noise reduction measures, including installation of a rubber lining applied to the metal surfaces associated with the barge loading and unloading conveyors; and use of broad-band backup beepers on mobile equipment. These measures have likely reduced noise from Quarry operations at nearby sensitive receptors; noise levels reported in the following section are therefore likely greater than those currently experienced.



SOURCE: Vibra-Tech

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.7-2
Noise Monitoring Data from
San Rafael Rock Quarry Station



SOURCE: ESRI, 2007

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.7-3
Noise Monitoring Locations

**TABLE 4.7-4
AMBIENT NOISE LEVELS AT MONITORED LOCATIONS, dBA**

Site ^a	Location	Measurement Period	Noise Level in dBA		
			L _{eq} or L _{dn}	L _{max}	Predominant Noise Sources
LT-1	28 Marin Bay Park Court	12:00 a.m. October 2, 2006 to 12:00a.m. October 5, 2006	L _{dn} of 52 to 55 dBA	80.7	Quarry operations
ST-1	St. Sylvester Chapel, Chapel Cove Drive and Point San Pedro Road	August 24, 2006 10:40 – 10:55 a.m.	63.8	75.7	Trucks and other vehicles on Point San Pedro Road
ST-2	Adjacent to setback of 76 Heritage Drive, east of main Quarry entrance.	August 24, 2006 11:00 - 11:15 a.m.	55.5	66.1	Trucks on Quarry access road
ST-3	McNear's Beach Park, Group B Site	August 24, 2006 11:35 – 11:50 a.m.	54.6	63.4	Quarry operations
ST-4	Cantera Way at foot of Marina Bay Park hillside.	August 24, 2006 12:04 – 12:19 p.m.	50.5	57.6	Quarry operations and blasting event (blasting event had a peak particle velocity of 0.058 inches per second (ips))
ST-5	16 Marin Bay Park Court Balcony	May 19, 2006 11:28 – 11:33 a.m.	52.7	60.0	Quarry operations and blasting event (blasting event had a peak particle velocity of 0.055 ips)
ST-6	2 Heritage Drive	September 26, 2006 10:45 – 11:00 a.m.	58.5	73.1	Trucks and other vehicles on Point San Pedro Road
ST-7	39 Lagoon Road	September 26, 2006 11:08 – 11:22 a.m.	59.6	74.8	Trucks and other vehicles on Point San Pedro Road
ST-8	Northeast Spur of Via Montebello	September 26, 2006 11:30 – 11:45 a.m.	52.9	59.9	Quarry operations
ST-8	Northeast Spur of Via Montebello	October 10, 2006 12:45 – 12:50 a.m.	54.9	62.4	Vehicles on Point San Pedro Road and blasting event (blasting event had a peak particle velocity of 0.058 ips)

^a Locations correspond to those illustrated in **Figure 4.7-3**.

SOURCE: Environmental Science Associates, 2006

Monitoring Site LT-1: 28 Marin Bay Park Court. This location is situated at the balcony of a residence that overlooks McNear's Beach Park and shielded visually from the Quarry by eucalyptus trees. At this location conveyor loading of materials at the Quarry was the single most substantial noise source. Secondary noise sources consisted of back-up alarms of mobile quarry equipment. Noise data was collected over a consecutive three day period in October of 2006. For residential land uses, noise levels of up to 60 dBA, L_{dn} are considered "normally acceptable", while 60 to 70 L_{dn} is considered "conditionally acceptable".

**TABLE 4.7-4.1
HOURLY NOISE LEVELS AT 28 MARIN BAY PARK COURT
(NEW TABLE IN THE FEIR)**

Hour (Starting Time)	Hourly Average Noise Level (dBA, Leq)
12:00 a.m.	43.1
1:00 a.m.	43.2
2:00 a.m.	43.3
3:00 a.m.	43.1
4:00 a.m.	43.1
5:00 a.m.	43.1
6:00 a.m.	43.2
7:00 a.m.	47.5
8:00 a.m.	49.0
9:00 a.m.	51.1
10:00 a.m.	48.0
11:00 a.m.	48.5
12:00 p.m.	51.5
1:00 p.m.	52.6
2:00 p.m.	52.4
3:00 p.m.	52.4
4:00 p.m.	53.0
5:00 p.m.	51.9
6:00 p.m.	50.8
7:00 p.m.	46.7
8:00 p.m.	44.5
9:00 p.m.	44.2
10:00 p.m.	43.8
11:00 p.m.	43.1

The monitored Ldn recorded at Monitoring Site LT-1 over three separate days varied from 52 to 55 dBA, which falls within the “normally acceptable” category for residential land uses relative to the County’s compatibility standard. Hourly average daytime noise levels (7:00 a.m. to 6:00 p.m.) were typically in the upper 40 to lower 50 dBA range, while nighttime hourly average noise levels were below 45 dBA. One exception to this characterization occurred on the night of Wednesday October 4th, when nighttime hourly average noise levels were recorded in the low 50 dBA range up until midnight (which resulted in the higher Ldn of 55 dBA for that day). The maximum noise level recorded during each of the three monitoring days ranged from 72 dBA to 81 dBA and were anomalous incidents in comparison to the majority of maximum readings.

Monitoring Site ST-1: St. Sylvester Chapel. Churches fall in the same land use category as schools, libraries and hospitals relative to land use compatibility noise standards in the County’s Noise Element. Noise levels of up to 60 dBA, Ldn are considered “normally acceptable”, while 60 to 70 Ldn is considered “conditionally acceptable.” While there are also many residences surrounding this site, these residences are set further back from the roadway than the Chapel and experience less noise due to the presence of sound walls along Point San Pedro Road.

Noise monitoring was conducted approximately 40 feet from the center of Point San Pablo Road at the setback of Chapel’s front façade. Noise at this location was dominated by vehicle traffic on Point San Pedro Road, particularly trucks approaching and leaving the Quarry. This location is protected from Quarry activities (excavation and loading of materials, conveyor noise etc.) by the intervening presence of South Hill. The average noise level recorded during the monitoring period was 64 dBA, Leq. Maximum noise levels occurred during truck pass-by events which ranged from 72 dBA to 76 dBA, depending on the size of the truck. Noise levels were observed to be approximately 52 dBA during quieter (non-truck) traffic periods. Based upon the monitored daytime noise levels and sources, the Ldn at this location currently would be expected to fall within the “conditionally acceptable” category for church land uses relative to the County’s compatibility standards.

Monitoring Site ST-2: 76 Heritage Drive. For residential land uses, noise levels of up to 60 dBA, Ldn are considered “normally acceptable”, while 60 to 70 Ldn is considered “conditionally acceptable”. This location is situated at the northeast end of Heritage Road. Noise monitoring was conducted approximately 150 feet from the center of Point San Pedro Road at the setback of the residential façade at 5 feet above ground level, which is elevated above Point San Pedro Road approximately 20 feet. At this location quarry trucks do not pass-by on Point San Pedro Road, as they have already turned into the Quarry. Noise at this location was dominated by vehicle traffic on Point San Pedro Road, and truck traffic on the Quarry access road. This location is protected from Quarry activities (excavation and loading of materials, conveyor noise etc.) by the intervening presence of South Hill.

The average noise level recorded during the monitoring period was 56 dBA, Leq. Maximum noise levels up to 66 dBA occurred when trucks were accessing the Quarry road. Noise levels were observed to be approximately 49 dBA during quieter (non-truck) traffic periods. Based upon the monitored daytime noise levels and sources, the Ldn at this location would be expected to fall

within the “normally acceptable” category for residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-3: McNear’s Beach County Park. For neighborhood park land uses, noise levels of up to 60 dBA, Ldn are considered “normally acceptable,” while 60 to 70 Ldn is considered “conditionally acceptable”. This location is situated at Group B Site at the southern end of the Park. Noise at this location was dominated by Quarry activity. Loading of barges via conveyor was clearly visible from this location. Equipment operating at the Quarry during this monitoring period included three conveyors, a loader, an excavator, and at least three dump trucks. Back-up horns were audible to the technician at this monitoring location.

The average noise level recorded during the monitoring period was 55 dBA, Leq, while maximum noise levels of 63 dBA were recorded. Based upon the monitored daytime noise levels and sources, the Ldn at this location is expected to fall within the “normally acceptable” category for park and residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-4: Along Cantera Road. Cantera Road is the access road to McNear’s Beach County Park. It also represents the fence line of the Quarry property relative to the residences on Marina Bay Park Court, which are elevated an additional 30 feet above the road to the north. Noise at this location was dominated by distant Quarry operations and infrequent vehicle noise along Cantera Road. The average noise level recorded during the monitoring period was 51 dBA, Leq. Maximum noise levels occurred when vehicles were accessing the Park via Cantera Road at up to 58 dBA. Noise levels from Quarry operations were observed to be approximately 44 dBA and 46 dBA when equipment back-up horns sounded. Additionally, a blasting event occurred during the monitoring period, which was observed to result in an instantaneous reading of 48 dBA. Based upon the monitored daytime noise levels and sources, the Ldn at this location is expected to fall within the “normally acceptable” category for park and residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-5: 16 Marin Bay Park Court. Noise at this location was dominated by distant Quarry operations. The average noise level recorded during the monitoring period was 53 dBA, Leq. The maximum noise level, which occurred during a blast event, was recorded at 60 dBA. Based upon the monitored daytime noise levels and sources, the Ldn at this location is expected to fall within the “normally acceptable” category for residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-6: 2 Heritage Drive. This location is situated at the southwest end of Heritage Road. Noise monitoring was conducted approximately 100 feet from the center of Point San Pedro Road at the setback of the residential façade at 5 feet above ground level, which is elevated above Point San Pedro Road approximately 15 feet. At this location, trucks accessing the Quarry on Point San Pedro Road are the single most substantial noise source as well as general vehicle traffic. During periods of low vehicle traffic, audible noise of Quarry operations consisted of repetitive squeaking of conveyor operations.

The average noise level recorded during the monitoring period was 59 dBA, Leq. Maximum noise levels up to 73 dBA occurred during a truck pass-by event. Noise levels were observed to be approximately 49 dBA during quieter (non-truck) traffic periods. Based upon the monitored daytime noise levels and sources, the Ldn at this location would be expected to fall within the “normally acceptable” category for residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-7: 39 Lagoon Road. This location is situated in front of a residence on Lagoon Road, which is a frontage road paralleling Point San Pedro Road. Noise monitoring was conducted approximately 100 feet from the center of Point San Pedro Road at the setback of the residential façade at 5 feet above ground level, which is elevated above Point San Pedro Road approximately 15 feet. At this location trucks accessing the Quarry on Point San Pedro Road are the single most substantial noise source as well as general vehicle traffic. During periods of low vehicle traffic, noise of Quarry operations consisting of repetitive squeaking of conveyors was barely audible.

The average noise level recorded during the monitoring period was 60 dBA, Leq. Maximum noise levels up to 75 dBA occurred during a truck pass-by event. Noise levels were observed to be approximately 49 dBA during quieter (non-truck) traffic periods. Based upon the monitored daytime noise levels and sources, the Ldn at this location would be expected to fall within the “conditionally acceptable” category for residential land uses relative to the County’s compatibility standard.

Monitoring Site ST-8: Northeast Spur of Via Montebello. This location is situated at a cul-de-sac off of San Marino Drive adjacent to residences with an elevated position relative to the Quarry. Noise monitoring was conducted at the setback of the residential rear façades at five feet above ground level. At this location conveyor loading of materials at the Quarry was the single most substantial noise source. Secondary noise sources consisted of vehicle traffic on local roadways and back-up horns of mobile quarry equipment.

The average noise level recorded during the monitoring period was 53 dBA, Leq. Maximum noise levels up to 60 dBA occurred during a vehicle pass-by event on San Marino Drive. Based upon the monitored daytime noise levels and sources, the Ldn at this location would be expected to fall within the “normally acceptable” category for residential land uses relative to the County’s compatibility standard.

On October 10, 2006 a blast event was also monitored at this location. The shot, which lasted less than a second in duration, was monitored to result in a 1-second average noise level of 61.2 dBA with an Lmax of 61.7 dBA. While this noise level exceeded the ambient noise level of the location observed during relatively quieter periods, typical daily events such as vehicle pass-bys on San Marino Drive or Point San Pedro Road were recorded to result in an equivalent noise level magnitude over a longer period of time.

Remote Noise Monitoring/Observations

Topography, wind, and temperature gradients can influence noise propagation. Consequently, even distant locations may be subject to operational noise. While topographical buffers exist that serve to attenuate Quarry operational noise from the adjacent land uses to the north, the Quarry site is unshielded to the east out toward San Pablo Bay. The nearest cross-Bay sensitive land uses would be residential areas of North Richmond approximately 4.5 miles to the east. These residences are separated from the Quarry site by the Chevron Refinery on Point San Pablo, which based upon existing data constitutes a significant noise source (ESA, 2006) between the Quarry and these residences. Observations and noise monitoring at Point San Pablo Yacht Harbor, approximately 2 miles east of the project site, revealed that Quarry operations were not audible under relatively stable meteorological conditions.

Vibration Monitoring Data

Vibration monitoring of SRRQ and its environs has been conducted since October of 2004. Table 4.7-5 presents several months of vibration data from 2005. These measurements were made with seismographs operated by SRRQ and by Vibra-Tech – a firm contracted to conduct independent monitoring by Marin County. An independent audit of these measurements is located in Appendix J of this document. This audit determined that PPV magnitudes monitored at residential properties near SRRQ were less than recommended vibration limits of the U.S. Bureau of Mines (0.5 to 2.0 in/sec) (though one of the monitored blasts had a PPV magnitude of 0.49 in/sec) intended to prevent cosmetic crack damage in plaster and drywall in typical wood frame homes. Historical monitoring records for SRRQ also indicate that air –overpressures are well below the 133-dBL limit set by the U.S. Bureau of Mining.

Complaint History

The County has maintained a history of blast events and complaints for SRRQ from April of 2005 through October of 2006. During this period 114 blasting events took place at the Quarry. Of these 114 blasting events during the period, 60 of them resulted in complaints from neighbors responding to vibrations and overpressure effects. These data indicate that greater than 50 percent of blasts result in perceived disturbance by surrounding residents. The locations of the homes of the neighbors who lodged complaints during the period April 15, 2005 through September 29, 2006 is plotted in Figure 4.7-4 to indicate the general pattern of disturbance.

The Countywide Plan indicates that noise generated by San Rafael Rock Quarry has been a source of complaints from neighboring residents. Additionally, complaints of neighboring residents regarding noise levels generated by SRRQ activities have been documented in Marin Superior Court Case No. CV 014584.

Impacts and Mitigation Measures

Significance Criteria

The California Environmental Quality Act Guidelines (*CEQA Guidelines*) provide standards for determining whether the effects of a potential impact should be considered significant.

Appendix G of the *CEQA Guidelines* provides that a project may be deemed to have a significant impact if it would result in:

**TABLE 4.7-5
SRRQ VIBRATION MONITORING DATA SUMMARY**

Date	Distance (feet)	Peak Particle Velocity (in/sec)	Max-Charge per Delay (lb)	Scaled Distance (ft-lb-0.5)	Frequency (Hz)
9/16/05	2218	0.09	600	90.55	11.3
9/16/05	1742	0.09	600	71.12	41.6
9/21/05	1610	0.083	600	65.73	17.9
9/21/05	1440	0.123	600	58.79	10.6
9/21/05	1813	0.043	600	74.02	21.7
9/21/05	528	0.49	600	21.56	23.8
9/21/05	1801	0.1	600	73.53	15.1
9/21/05	1908	0.13	600	77.89	12.8
9/21/05	1640	0.13	600	66.95	16.1
10/07/05	1824	0.043	600	74.46	14.7
10/07/05	1588	0.058	600	64.83	3.8
10/07/05	686	0.13	600	28.01	17.2
10/07/05	2060	0.06	600	84.10	6.0
10/21/05	1651	0.048	600	80.56	31.3
10/21/05	1360	0.068	420	66.36	50.0
10/21/05	739	0.13	420	36.06	11.1
10/21/05	2059	0.07	420	100.47	18.5
10/21/05	1478	0.07	420	72.12	45.4
10/31/05	1671	0.035	420	77.91	8.6
10/31/05	1351	0.093	460	62.99	8.6
10/31/05	898	0.19	460	41.87	11.9
10/31/05	2112	0.07	460	98.47	11.6
10/31/05	1426	0.1	460	66.49	18.5

SOURCE: Vibra-Tech, 2005

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;



SOURCE: Marin County Public Works, 2006

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.7-4
Location of Complaints
Regarding Blast Effects

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels;
- For a project within the vicinity of a private airstrip would the project expose people residing or working in the project area to excessive noise levels.

Consistent with policy and guidance provided by the County of Marin Environmental Impact Report (EIR) Guidelines, Appendix N, an effect of the proposed project would be considered significant if it causes one or more of the following impacts:

- The project would generate noise that would conflict with Countywide noise standards or other state or local noise standards;
- The project would propose land uses that substantially increase noise levels in areas of sensitive receptors; or
- The land use proposed by the project would not be compatible with baseline noise levels.

To assess long-term changes in the ambient noise environment at nearby noise-sensitive receptor locations, the applicable programs from the Countywide Plan Update Noise Element shall constitute significance criteria for the projects. These include the guidelines set in Programs NO-1a and NO-1c. Program NO-1c contains the most specific guidance for determining significance, and while this program pertains primarily to transportation-related noise sources, the criteria contained in the text of the program shall serve here as significance thresholds for all potential new noise sources generated by the project. Programs NO-1a and NO-1c use the community noise standards shown in Table 4.7-1 as the basis of the guidelines:

Program NO-1.a Enforce Allowable Noise Levels. Through CEQA and County discretionary review, require new development to comply with allowable noise levels.

The Acceptable Noise Levels in Table 4.7-1 shall be used as a guide for determining the appropriate type of new development in relation to its ambient noise environment. Table 4.7-1 applies primarily to proposed development exposed to transportation generated noise and to existing development exposed to increases in transportation generated noise due to proposed development. The standards in Table 4.7-1 shall also be used to determine allowable noise levels for commercial, industrial, agricultural, or other less-noise-sensitive land uses exposed to stationary source noise generated by new development.

The Benchmarks for Allowable Noise Exposure from Stationary Noise Sources in Table 4.7-2 shall be used as a guide for establishing allowable noise levels produced by stationary noise sources. These standards shall apply to new residential projects and other noise-sensitive land uses proposed near stationary noise sources. The standards shall also apply to new stationary noise-generating development proposed near existing residential or other noise-sensitive land uses.

It should be noted that the standards in Tables 4.7-1 and 4.7-2 are for purposes of planning and siting land uses. The standards are not a noise ordinance and are not to be used to

achieve the same objectives as a noise ordinance. The standards are not to be used for regulating existing noise sources or enforcement concerning noise problems.

Program NO-1.c Require Project-Specific Noise Mitigation.

Require all development to mitigate its noise impacts where the project would

- raise the Ldn by more than 5 dBA;
- raise the Ldn by more than 3 dBA and exceed the Normally Acceptable standard; or
- raise the Ldn by more than 3 dBA and the Normally Acceptable standard is already exceeded.

Community noise standards contained in the Countywide Plan Noise Element vary but are, at their most restrictive, limiting to 45 dBA hourly Leq for nighttime noise from stationary sources. While these standards are established for the purposes of land use compatibility, it should be noted that operations conducted within these established limits may still be audible, particularly during quieter nighttime hours. Consequently, it is possible for industrial operations to be noticeable and yet not constitute a significant noise impact relative to established standards. The potential for subjective annoyance impacts from operational noise and other operational effects is addressed in Section 4.6, Land Use and Planning.

Vibration and Air-overpressure Impact Criteria

In Report of Investigations RI 8507, the US Bureau of Mines (Siskind, 1980) recommended safe ground motion limits ranging from 0.5 to 2.0 in/s, which are the basis for most regulatory blast-induced vibration levels in most State and federal jurisdictions throughout the United States and are specifically intended to prevent cosmetic crack damage in plaster or drywall in typical wood frame homes. Significantly higher PPV limits, ranging from 5.0 to 20 in/s (Oriard, 1980; Siskind, 1993; Revey, 2006), are used to protect concrete, steel structures, buried pipes and other structural elements of buildings.

For air-overpressure, the regulatory limit defined by USBM, and used in almost all blasting regulations throughout the United States, for air-overpressure measured with 2-Hz response seismographs is 133-dBL. Damage to old or poorly glazed windows does not occur until air-overpressure reaches about 150 dBL. Use of the 133-dBL air-overpressure significance criteria will prevent damage to structures impacted by blasting activities. However, rattling of windows at nearby residences may still occur as the result of air-overpressures that are within this standard.

Impacts of the Amended Reclamation Plan

Impact R4.7-1: Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations (Beneficial).

The applicant proposes to construct a 70-foot high berm across approximately 600 feet of the northern property line of the NE Quadrant. Construction of the berm in the NE Quadrant would

involve the use of heavy duty construction equipment and trucks on-site. The location of the berm would be approximately 300 feet from the residences located on Marin Bay Park Drive. Construction would occur over a 10-week period during the dry season.

As shown in Table 4.7-6, construction equipment generates noise levels of 80 to 89 dBA at a distance of 50 feet from the source. At a distance of 300 feet these noise levels would attenuate to 65 to 74 dBA. These predicted noise levels would temporarily increase noise levels at residences located along Marin Bay Park Court as well as for visitors of McNear's Beach Park, depending on the elevation and intensity of equipment usage at a given stage of construction. Existing monitored daytime noise levels at these locations averaged 50 to 52 dBA. This increase in noise levels during the construction of the berm in the NE Quadrant is considered a significant, though temporary, impact.

**TABLE 4.7-6
TYPICAL CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS**

Equipment	Noise Level (L _{eq}) ^a
Scraper	89
Dozer	85
Loader	85
Backhoe	80
Grader	85
Shovel (Excavator)	82
Rockdrill	98
Truck	88

^a Estimates correspond to a distance of 50 feet from the piece of equipment.

SOURCE: U.S. Department of Transportation, Transit Noise and Vibration Impact Assessment, April 1994.

Once constructed, the proposed berm would serve as a noise buffer that would reduce noise related to phased reclamation grading as well as from operational noise from the Quarry. Residences located along Marin Bay Park Court would experience a reduction in noise levels from such activities as conveyer loading of barges as well as from planned reclamation activities slated for the NE Quadrant. The beneficial noise impact of the berm would occur for approximately 10 to 12 years until it would be removed during the fourth phase of reclamation. Removal of the berm would also temporarily have a significant noise impact as described above for construction.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.7-1a: All rolling vehicles at the Quarry are retrofitted with broadband backup alarms. Broad band alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), be being 5 dBA quieter than conventional

back-up alarms and by generating noise that is has a less intrusive tonal quality (Brigade Electronics, 2007; Hub-4, 2007).

Mitigation Measures Identified in this Report

Mitigation Measure R4.7-1b: Implementation of the following construction noise abatement measures would reduce the impact of temporary construction noise. Because of its temporary nature, berm construction noise impacts would be similar to those resulting from site preparation and grading of most general development projects.

- The applicant shall limit berm construction to 7:00 a.m. to 5:00 p.m. Monday through Friday;
- Equipment and trucks used for berm construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds);
- All construction equipment powered by internal combustion engines shall be properly muffled and maintained;
- Unnecessary idling of internal combustion engines shall be prohibited.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.7-1: The Marin County Department of Public Works will be responsible for monitoring adherence to noise mitigation measures.

Level of Significance after Mitigation

While construction noise abatement measures would reduce the impact of temporary construction noise, by restricting hours of operation and promoting operational restrictions, it is unlikely that a reduction of construction noise to 58 dBA at the nearest residences would be achieved. Although temporary in nature, berm construction noise impacts would result in an increase of greater than 6 dBA over existing levels and would be considered significant and unavoidable, though temporary, even with mitigation.

Impact R4.7-2: Construction of the surcharge berm in the NW Quadrant would result in temporary construction noise (Less than Significant) but would also result in a noise buffer for daily operations (Beneficial).

The applicant proposes to construct a 15-foot high L-shaped berm stretching a cumulative distance of 1,500 linear feet within the NW Quadrant (see Figure 3-9 in Chapter 3). Construction of the surcharge berm in the NW Quadrant would involve the use of heavy duty construction equipment and trucks on-site. The location of the berm would be approximately 1,200 feet from the residences located on Heritage Drive. Construction would occur over 8-10-week periods during the dry season of Phase 2 reclamation.

As shown in Table 4.7-6, construction equipment generates noise levels of 80 to 89 dBA at a distance of 50 feet from the source. At a distance of 1,200 feet, these noise levels would attenuate to 52 to 61 dBA. These predicted noise levels would temporarily increase noise levels at residences located along Heritage Drive and San Marino Drive, depending on the elevation and intensity of equipment usage at a given stage of construction. Existing monitored daytime noise levels at these locations averaged 56 to 59 dBA. Because this would not result in an increase in ambient noise levels above threshold values, noise from the construction of the surcharge berm in the NW Quadrant would be considered a less than significant impact.

Once constructed, the proposed berm would serve as a noise buffer that would reduce operational noise from McNear's Brickworks. Residences located across Point San Pedro Road would experience a reduction in noise levels from conveyers at the Brickworks. While the existing monitored noise levels at these residences is within the range considered "normally acceptable" for residential land uses as specified in the Countywide Plan, the noise attenuation provided by the berm would serve to reduce further noise perceived at these locations. The beneficial noise impact of the berm would occur for approximately 7 to 10 years until it would be removed during the fourth phase of reclamation. Removal of the berm would also have a temporary noise impact as described above for construction, which would also be less than significant.

Mitigation: None required.

Impact R4.7-3: Mixing of pond fines in the NE Quadrant would involve the use of heavy duty equipment, which would generate noise at nearby sensitive receptors (Less than Significant).

The mixing of pond fines would involve an added step to reclamation activities not previously contemplated, as materials would need to be mixed and transported to their location for use as fill. It is presumed that this activity would require the operation of loaders and trucks that were not contemplated in ARP82. Mixing of pond fines would occur in the NE Quadrant under all phases of reclamation. The pond fines stock piles are located approximately 500 feet from the residences located on Marin Bay Park Drive. This activity would occur after construction of the NE Quadrant berm, which would serve to attenuate noise generated by mixing of pond fines.

As shown in Table 4.7-6 loaders and trucks generate noise levels of 85 to 88 dBA at a distance of 50 feet from the source. At a distance of 500 feet these noise levels would attenuate to 65 to 68 dBA, however, the presence of the berm would offer a noise attenuation of at least 12 dBA, which would reduce noise levels to 53 to 56 dBA. Existing monitored daytime noise levels at nearby residences averaged 50 to 52 dBA. This increase in noise levels during the mixing of pond fines would be considered a less than significant, temporary impact.

Mitigation: None required.

Impact R4.7-4: Post-reclamation land uses proposed under the 2004 Amended Reclamation Plan (ARP04) would result in increased ambient noise (Less than Significant).

Post-reclamation land uses developed after completion of reclamation activities would consist of a mix of housing, commercial uses, community facilities (parks) and a marina. Each of these future land uses would result in additional ambient noise, primarily from vehicle traffic generation, but also from other noise sources such as pleasure craft motors and possibly ferry boat engines in the Marina and ventilation equipment for commercial uses. Noise from pleasure craft and ferries would depend on the number and size of vessels berthed and the frequency of daily operations, which are unknown at this time.

While noise increases resulting from post-reclamation development may be substantial, it should be noted that these increases would also occur under the existing 1982 Amended Reclamation Plan (ARP82), which proposed similar post-reclamation uses. Consequently, the proposed ARP04 would not result in a net increase in noise generation from post-reclamation land use development and noise increases associated with post-reclamation uses are not interpreted as a significant noise impact of the proposed project, and therefore no mitigation is required.

Mitigation: None required.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.7-5: Continued operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit would result in increased ambient noise levels above baseline levels (Less than Significant).

The baseline for current operations is considered to be the scope of the Quarry's use of the SRRQ site at the time the Quarry became a legal nonconforming use in 1982. At that time, noise-generating operations occurred generally during daylight hours on weekdays, except during times of declared emergencies, as stated in the 1982 Amended Reclamation Plan. Noise monitoring in 1982 at the location of the then-nearest residences indicated that noise from Quarry operations was not audible, with the exception of mobile equipment back-up alarms.

Under the proposed AQP, the Quarry would conduct noise-generating operations, including rock crushing, barge loading, and mining operations other than blasting, up until 10:00 p.m (see Table 3-9 in Chapter 3, Project Description). Trucks would be restricted from entering the facility prior to 7:00 a.m., as they are under the Marin County Superior Court order.

Noise monitoring conducted for this EIR found that noise at the now-nearest residences on Marin Bay Park Court (Site LT-1) ranged from 52 to 55 dBA, Ldn over the course of three days, and that conveyor loading of materials at the Quarry was the single most substantial noise source, with secondary noise sources including back-up alarms from mobile quarry equipment.

The noise levels monitored at Site LT-1 do not exceed established County noise standards for land use compatibility for residences (i.e., 60 dBA, Ldn), so from this perspective the impact is considered less than significant.

Noise from the quarry's stationary equipment, including rock crushing and sorting, conveyors, and barge-loading, exceeds the County's 50 dBA daytime (7:00 a.m. to 10:00 p.m.) benchmark for allowable noise exposure from stationary sources (see Table 4.7-2). Daytime noise in excess of an hourly Leq of 50 dBA was monitored at Site LT-1: monitored noise levels ranged from 48 to 55 dBA. However, as stated in the Countywide Plan Noise Element guidelines for using the Table 4.7-2 standards, "The allowable noise level standard shall be raised to the ambient noise level in areas where the ambient level already exceeds the standards shown in this table. For example, if the neighborhood already experiences daytime hourly noise levels of 60 dBA as an ambient condition, the noise level standard shall be raised to 60 dBA."

Future Quarry operations are expected to produce less noise than past operations. As part of reclamation grading, the applicant plans to construct a berm in the NE Quadrant, as well as a surcharge berm in the NW Quadrant, both of which will act as noise buffers for nearby residents. In addition, the applicant has already implemented best management practices for noise reduction from operations, including use of rubberized barge feeders and transfer boxes, and installation of directional/reduced noise back-up alarms on all rolling stock (Peer, 2008).²

Furthermore, Mitigation Measure ~~R4.6-6b4.6-1a~~, which will limit production levels and hours of operation of the Quarry will further reduce noise levels relative to those currently experienced by neighbors of the Quarry.

Because future Quarry operations are not expected to produce noise that exceeds that which already is experienced at the site of nearby residences, and current noise levels do not exceed the compatibility standards for residential land uses, the impact is less than significant.

Mitigation: None required.

Impact P4.7-6: Continued operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit would expose residents along Point San Pedro Road to traffic-related noise (Less than Significant).

Residences located west of the Quarry access road are exposed to noise from heavy-duty trucks used to haul quarried materials. Trucks using Point San Pedro Road pass within 60 feet of residences on Heritage Drive and within 50 feet of residences on Lagoon Road. Many other residences are also located adjacent to Point San Pedro Road further west and north of the Quarry. While other vehicles also use Point San Pedro Road regularly, observations conducted

² The Quarry reports that they now voluntarily delay start of operations on Saturdays until 9:00 a.m. if they are loading barges, and that they have voluntarily suspended barge loading on Sundays except during a declared emergency (Peer, 2008).

during noise monitoring at these locations revealed that quarry-related truck traffic is the predominant daytime noise source along these roadways, resulting in pass-by events of 64 to 74 dBA, depending on the direction of travel. Standard passenger vehicle pass-by events were monitored at 61 to 63 dBA and background daytime noise levels during periods of no traffic were found to be 49 dBA. Leq values at these monitoring locations were generally below 60 dBA.

The maximum daily level of truck traffic proposed under the AQP would not exceed the levels apparently experienced in 1982, when the Quarry became a legal non-conforming use. Therefore, noise levels from trucks along Point San Pedro Road would be expected to be similar to the levels in 1982. While there are now more residences in close proximity to Point San Pedro Road than there were in 1982 (particularly along Heritage Drive), the monitored noise levels near these residences indicate that the noise environment is within the “acceptable” or “conditionally acceptable” range for residences established in the Countywide Plan Update Noise Element (Table 4.2-1). Therefore, this impact would be less than significant, and does not require mitigation. See, however, Impact ~~C4.6-7~~ 4-6-4 in Section 4.6, Land Use and Planning Section for a discussion of the contribution of noise to a land use incompatibility cumulative impact.

Mitigation: None required.

Impact P4.7- 7: Continued blasting at the Quarry would expose neighbors of San Rafael Rock Quarry to vibrations that exceed human annoyance levels (Significant).

As previously stated, a 1982 report of noise and vibration near the Quarry site found that “[B]lasting at McNear’s Quarry takes place approximately two times a week” (Illingworth, 1982, p. 4). The noise study references a vibration study by an “independent consultant” in 1980 at a home on San Marino Drive that indicated that “...vibrations generated by blasts range from ‘imperceptible’ to ‘barely perceptible’ and are below human annoyance levels” (ibid, p. 4). Numerous complaints received by the Marin County Department of Public Works in recent years, however, indicate that current blasting practices exceed human annoyance levels. As the Quarry proposes to continue blasting using current practices and at current levels, there will be a continuing impact on neighboring residences that exceeds the conditions apparently experienced in 1982, causing a significant impact.

An independent assessment of existing rock blasting practices and impacts was prepared for this EIR by Revey Associates and is contained herein as Appendix J. The impact analysis below summarizes key information from this blasting assessment regarding potential impacts. Information provided by the applicant, in combination with a number of conservative assumptions, were used in the assessment potential of worst-case impacts.

Blasting at SRRQ generally occurs once around noon approximately three days a week. This frequency of blasting would continue during the proposed deeper excavation of the Main Quarry Bowl. As discussed in the Revey report, there are alternative methods other than blasting

available to fragment rock but these methods are either economically unfeasible or have secondary noise impacts that far exceed the potential impacts caused by blasting.

Analysis of vibration data collected between October of 2004 and November of 2006 indicates that the intensity range of ground motions measured near residential property during this time are less than the “safe level” vibration curves of the U.S. Bureau of Mines for applicable frequencies (measured vibration frequencies from blasting were between 9 and 40 Hz). No measurements recorded near residential property exceeded 0.5 inches per second. Consequently, continued blasting at SRRQ would not be expected to result in new damage or even the extension of existing cosmetic cracks in plaster or drywall in any residential property near SRRQ.

In addition to concerns about vibration damage, under certain conditions, humans and animals can be startled or annoyed by blast-induced ground vibration. Research has also shown that the human response to transient vibrations--like those caused by blasting--varies depending on exposure time and the intensity of the motion. Table 4.7-7 presents the expected effects of vibrations of varying intensity. Historical data indicate that the intensities of peak ground motions near residential properties around SRRQ approach and occasionally exceed 0.25 in/s. Available studies indicate that complaints are likely when the intensity of ground motions exceed 0.2 in/s. As previously stated, the Marin County Department of Public Works has received numerous complaints in recent years regarding vibrations from blasting, while vibration monitoring indicates that 100 percent of vibration levels monitored independently (by Vibra-Tech under contract to the County) at locations within and close to surrounding residential areas during 2005 were below 0.2 in/s.

SRRQ has an existing internal policy to manage its blasting procedures to avoid ground based vibrations in excess of 0.5 inches per second (in/s). This is sufficient to prevent damage to residential buildings. However, as indicated in Table 4.7-7 and demonstrated by the record of complaints received, ground motions lower than 0.5 in/s are felt by nearby residents, who often find such motions annoying. Consequently, blasting within the limits proposed for the AQP would still be expected to result in annoyance of neighbors from ground-based vibration. Since ground motions are not expected to cause damage to property, the effects are considered an annoyance, and can be characterized as a continuing annoyance.

Air-Overpressure

At the SRRQ operation, all historical monitoring records indicate that air-overpressures are well below the 133-dBL limit of the U.S. Bureau of Mines. This is likely because most of the mining has occurred in deep benches so air-overpressure waves have been deflected or otherwise shielded by the quarry walls. In many instances, overpressure waves in air cause secondary window and wall rattling and home owners often mistakenly believe the noise and shaking is caused entirely by ground vibration. Instead, the window and wall rattling is the result of air-overpressure on the exterior walls of the residence. Air-overpressure at levels below 130 dBL creates less strain in walls than a 30-mph wind gust. Consequently, there would be no concern that structural damage is occurring at air-overpressures below 130dBL. However, as with ground-borne vibration, the effects of blast air-overpressure are disturbing, and can also be characterized

**TABLE 4.7-7
VIBRATION EFFECTS THRESHOLD VALUES**

Peak Particle Velocity Threshold (inches/second)	Effect
23.62	New cracks form in rock
11.81	Falls of rock in unlined tunnels
7.48	Falls of plaster and serious cracking in buildings
5.51	Minor new cracks, opening of old cracks
3.94	Safe limit for lined tunnels, reinforced concrete
1.97	Safe limit for residential buildings
1.18	Feels severe
0.39	Disturbing to people
0.20	Some complaints likely
0.04	Vibrations are noticeable
< 0.04	Barely perceptible vibrations

SOURCE: Revey Associates, 2007 (Appendix J), from Hendron and Oriard, 1982.

as a continuing annoyance. With current and future operations on South Hill, which have a direct line-of-site to some nearby residences, effects from blast air-overpressure can be expected to worsen.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure P4.7-7a: The AQP contains the following provisions to limit the adverse effects of blasting:

- Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.5 inches per second.
- The quarry shall provide 36 hours advance notification of blasting to local residents and to the County of Marin by posting the date and approximate time of scheduled blasts on a web site.
- Blasting shall be limited to the hours of 11:30 a.m. to 1:30 p.m. Monday through Friday. No blasting is to occur on State holidays or weekends.

Mitigation Measures Identified in this Report

Mitigation Measure P4.7-7b: Implementation of the following would reduce the impact of vibration and air-overpressure from rock blasting activities:

- Blasts should be designed to maintain a minimum scaled distance of $52.8 \text{ ft/lb}^{1/2}$, as defined in the Revey Associates report (Appendix J).

- Corresponding to the scale distance, the ground motion should not exceed 0.25 inches per second peak particle velocity.
- All charges should be confined with clean crushed stone of height equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report. Air-overpressure measured near residential home should never exceed 133 dBL, as measured with 2-Hz monitoring equipment.
- All charges should be confined with rock burden equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report.

All blast monitoring of ground motion and air-overpressure effects done by either SRRQ personnel or third-party service providers should be done in full conformance with ISEE guidelines provided in Attachment I of the Revey Associates report (Appendix J).

Draft Mitigation Monitoring Measure P4.7-7: As a condition of approval of the new AQP, SRRQ will be required to continue its current program of seismic monitoring. DPW will verify compliance with this requirement through the receipt and review of blasting reports from SRRQ.

Level of Significance with Mitigation

The above measures will ensure that blasting at SRRQ will not cause structural damage to nearby residential buildings. These measures will also reduce to the extent practical the disturbing effects of blasting on the Quarry's neighbors. It is likely, however, that such effects will continue. The level of continuing impact may be considered below the threshold of significance; the inevitable and ongoing disturbance of neighbors is another aspect of the incompatibility of the Quarry with surrounding land uses, as discussed in Impact ~~4.6-7~~ 4.6-4 in Section 4.6, Land Use and Planning.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

Impact C4.7-8: The proposed Amended Reclamation Plan would result in an increase in on-site equipment operations as a result of reclamation activities being conducted simultaneous with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. These increased equipment operations would increase noise levels generated on site and may affect off-site receptors (Less than Significant).

The proposed ARP04 would involve the operation of earthmoving equipment for reclamation activities in addition to equipment already in operation for quarrying activities. A principal difference between ARP82 and the proposed ARP04 would be that under ARP04, noise from continued quarrying operations would occur as well as reclamation equipment noise for a 15 to 17 year period, while under ARP82 only reclamation equipment noise would occur after the cessation of quarrying.

Under either ARP82 or ARP04 noise would be generated by reclamation activity. Equipment proposed to be used for reclamation activities under ARP04 includes five scrapers, four bulldozers, one front-end loader, one backhoe, a road grader, a water truck, and three light-duty trucks. Noise emission levels for each of these proposed types of equipment are presented in Table 4.7-6. It is unlikely that all of the above cited equipment proposed to be used for reclamation would operate simultaneously. Equipment noise levels would be substantially attenuated by intervening topography, depending upon the location of a particular reclamation activity at a given point in time. It can be assumed that this equipment noise generation would occur under both the existing and the proposed reclamation plans (potential noise impacts resulting from differences of individual elements of the reclamation plan [i.e., berms] are discussed individually under separate impact statements).

Consequently, one implication of ARP04 is to add the noise of quarrying operations to those of reclamation activities. As shown in Figure 4.7-2, noise monitoring of existing quarrying operations indicates that noise levels at the fence line are generally within the benchmarks for allowable noise exposure from stationary noise sources established in the Countywide Plan. While quarrying operations are audible at the balconies of residences on Marin Bay Park Drive, monitored long-term noise levels (up to 55 dBA, Ldn) at these locations also indicate that noise levels are within the “normally acceptable” category for residential land uses established in the Countywide Plan (60 dBA). Because quarrying operations are conducted within Countywide Plan standards, the potential for noise impacts from ARP04 would result from cumulative noise generation of Quarry operations and reclamation activities to exceed noise exposure benchmarks.

Noise from quarrying operations results from on-site equipment including eight trucks, seven front-end loaders, three excavators, one bulldozer, and a rock drill as well as stationary noise sources such as conveyors, crushers, and screening equipment. Like reclamation equipment, the mobile equipment is usually not operating simultaneously or all at one location on site. Trucks are used to haul materials across site and their noise energy does not emanate from a single point. Loaders and excavators tend to be more stationary but change location depending on the excavation target at a given time. Consequently, it is not realistic or representative of future conditions to sum the sound energy of this equipment at a given point for the purposes of impact assessment.

To assess the potential noise impact from the resultant cumulative noise generation of both reclamation activities and quarrying activities it can be conservatively assumed that the resultant sound energy when both these activities occur simultaneously would double that of existing quarrying activities. This assumption is reasonable because the number of pieces of heavy-duty mobile equipment would be similar for each activity, and it is conservative because stationary equipment would not be involved in reclamation. A doubling of sound energy would result in an overall increase in noise levels of 3 dBA. The addition of 3 dBA to the daytime hourly noise averages would result in an increase of less than 2 dBA, Ldn at the nearest receptors, which currently experience long-term noise levels of up to 55 dBA, Ldn. Consequently, with the combination of noise from reclamation and quarrying, long-term noise at the nearest residences would increase by less than 3 dBA and would remain less than 60 dBA and still be considered

“normally acceptable” for residential land uses relative to standards of the Countywide Plan. Hence, the proposed simultaneous activity of reclamation and quarrying operations would not result in a significant noise impact.

Mitigation: None required.

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4.8 Hazards and Hazardous Materials

Introduction

This section discusses existing conditions at the project site, and the potential public health and environmental issues related to storage, use or accidental release of potentially hazardous materials from the project and project site, worker safety, and potential wildfire hazards at the project site. All potential effects on air quality associated with the project (including air toxics) are addressed in Section 4.2, Air Quality. Refer to Section 4.9, Public Services, ~~and~~ Utilities, and Energy for additional information regarding fire protection services at the project site.

Setting

Regulatory Setting

Definitions

Hazardous Materials

Hazardous materials are substances with certain physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. Hazardous materials are grouped into the following four categories, based on their properties: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), and reactive (causes explosions or generates toxic gases).¹ Hazardous materials have been and are commonly used in commercial, agricultural, and industrial applications, as well as in residential areas to a limited extent.

Hazardous Waste

A hazardous waste is any hazardous material that is discarded, abandoned, or is to be recycled. Hazardous materials and wastes can result in public health hazards if released to the soil, groundwater, or air.

Regulatory Framework

Hazardous Materials Management

Numerous local, state, and federal laws and regulations regulate the use, storage, and disposal of hazardous materials, including management of contaminated soils and groundwater. The United States Environmental Protection Agency (USEPA) is the federal agency that administers hazardous materials and waste regulations. State agencies include the Cal/-EPA, which includes the Department of Toxic Substances Control (DTSC), the San Francisco Bay Regional Water Quality Control Board (RWQCB), the California Air Resources Board (CARB), and other offices. The Bay Area Air Quality Management District (BAAQMD) has jurisdiction over the air basin, which includes Marin County. Local regulatory agencies include the Marin County

¹ Title 22 of the California Code of Regulations, Division 4.5, Chapter 11, Article 3.

Environmental Health Services Division. A description of agency jurisdiction and involvement in management of hazardous materials is provided below.

United States Environmental Protection Agency (USEPA). The USEPA is the federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials. The legislation includes the Resource Conservation and Recovery Act of 1986 (RCRA), the Superfund Amendments and Reauthorization Acts of 1986 (SARA), and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The federal regulations are primarily codified in Title 40 of the Code of Federal Regulations (40 CFR). The USEPA provides oversight and supervision for site investigations and remediation projects, and has developed land disposal restrictions and treatment standards for the disposal of certain hazardous wastes.

California Department of Toxic Substances Control (DTSC). The California DTSC works in conjunction with the USEPA to enforce and implement specific laws and regulations pertaining to hazardous wastes. California legislation, for which DTSC has primary enforcement authority, includes the Hazardous Waste Control Act and the Hazardous Substance Account Act. Most state hazardous waste regulations are contained in Title 22 of the California Code of Regulations (CCR). The California DTSC generally acts as the lead agency for soil and groundwater clean up projects, and establishes clean up and action levels for subsurface contamination that are equal to, or more restrictive than, federal levels.

San Francisco Bay Regional Water Quality Control Board (RWQCB). The project site is located in the jurisdiction of the San Francisco Bay RWQCB. The RWQCB is authorized by the California Porter-Cologne Water Quality Act of 1969 to implement water quality protection laws. The RWQCB provides oversight for sites where the quality of groundwater or surface waters is threatened, and has the authority to require investigations and remedial actions.

California Air Resources Board (CARB) and the Bay Area Air Quality Management District (BAAQMD). The project site is in the Bay Area Air Basin. The CARB and BAAQMD have joint responsibility for developing and enforcing regulations to achieve and maintain state and federal ambient air quality standards in the district. CARB is responsible for enforcing the Clean Air Act and California's State Ambient Air Quality Standards. BAAQMD is responsible for regulating air emissions from stationary sources, monitoring air quality, and reviewing air quality issues in environmental documents. Section 4.2, Air Quality further describes the responsibilities of CARB and BAAQMD, air quality conditions in the Bay Area Air Basin, and potential air quality impacts associated with the proposed project.

Local Hazardous Materials Management. The primary agencies responsible for local enforcement of state and federal laws controlling hazardous materials management include the Waste management Division of the Marin County Department of Public Works and the Environmental Health Services Division of the Marin County Community Development Department, the former of which is a Certified Unified Program Agency (CUPA), the local agency responsible for coordination of hazardous waste generator programs, underground fuel tank management, tiered permitting process for waste treatment, and administering the Hazardous

Materials Business Plan program. A CUPA is responsible for management of leaking underground storage tank site investigation and cleanup.

Businesses that store, handle, or dispose of hazardous materials must submit a Hazardous Materials Business Plan (business plan) in accordance with the California Health and Safety Code Section 25504. The business plans must be updated every two years or within 30 days after a substantial change in site operations. The business plan must:

- List all the hazardous materials stored at a site
- Identify emergency response procedures for spills and personnel
- Identify evacuation plans and procedures
- Identify training records for personnel to substantiate annual refresher training

If hazardous materials are used or stored at a site, all employees are also required to receive hazard communication training. The purpose of the training is to ensure that employees understand the nature of the hazardous materials that they handle and can safely use, store, and dispose of the materials in accordance with Title 8, CCR. The hazard communication standard requires that employers must:

- Prepare an inventory of hazardous materials
- Make Material Safety Data Sheets available to employees
- Conduct employee training on chemical hazards and safe handling of materials
- Ensure that hazardous material containers are properly stored and labeled

Inspections of businesses that store hazardous materials are performed by the CUPA. The hazard communication requirements are enforced by the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA).

Worker Health and Safety. Worker health and safety is regulated at the federal level by the Federal Department of Industrial Relations. Worker health and safety in California is regulated by Cal/OSHA. California standards for workers dealing with hazardous materials are contained in Title 8, CCR, and include practices for all industries (General Industry Safety Orders), and specific practices for construction, and hazardous waste operations and emergency response. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

Marin County Surface Mining and Reclamation Ordinance

The Marin County Surface Mining and Reclamation Ordinance (Section 23.06 of the municipal code) established procedures for reviewing, approving, and/or permitting surface mining operations, reclamation plans, and financial assurances in the unincorporated areas of Marin County. The ordinance sets forth the general procedural, operational, and reclamation requirements that must be complied with, where applicable, by mining and quarrying in the County. The following section contains is the only reference to hazards in the ordinance:

- (b) Financial assurances will be required to ensure compliance with elements of the reclamation plan including, but not limited to, revegetation and landscaping requirements, restoration of aquatic or wildlife habitat, restoration of water bodies and water quality, slope stability and erosion and drainage control, *disposal of hazardous materials*, and other measures, if necessary. (italics added)

Countywide Plan Update 2007 Hazards and Hazardous Materials Policies

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to hazards and hazardous materials are discussed in Section 4.6, Land Use and Planning.

Hazardous Materials Background and Current Site Conditions

Project Site

Site Description

The project site is a permitted, active quarry. The facility currently handles a number of hazardous materials, primarily lubricating oils and diesel fuel, and generates hazardous waste, primarily waste oil and filters. Most of the hazardous materials handled in quantity on-site are located in the shop areas, asphalt plant, and lubrication storage area. Table 4.8-1 presents a list of hazardous materials and wastes stored on-site at SRRQ and their quantities typically present. The project site does not currently contain any known underground storage tanks. SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.

Hazardous Materials Sites Databases

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the state, local agencies and developers to comply with the California Environmental Quality Act requirement of providing information about the location of hazardous materials release sites. Government Code section 65962.5 requires the California Environmental Protection Agency (Cal-EPA) to develop at least annually an updated Cortese List. A number of state and local government agencies are required to provide additional hazardous material release information for the Cortese List.

DTSC is responsible for compiling a portion of the information contained in the Cortese List. These include State Response and/or Federal Superfund sites, and Backlog sites listed under Health and Safety Code section 25356, as well as Certified with Operation and Maintenance sites.

Other applicable databases include, but not limited to, the State Water Resources Control Board (SWRCB) Leaking Underground Storage Tanks list (LUST) and Spills, Leaks, Investigations, and Cleanups Report (SLIC).

**TABLE 4.8-1
 HAZARDOUS MATERIAL STORAGE AT SRRQ**

Material^b	Estimated Average Quantity^a	Location Stored
Asphaltic Oil	20,000	Asphalt Plant
Airlift 1274 Release Agent	300	Spray Rack
Nalco Optimer	600 pounds	Processing Olant
Unleaded Gasoline	1,000	Fuel Dock
Diesel Fuel Oil	30,000	Fuel Dock
Diesel Fuel Oil	200	Asphalt Plant
Motor Oil (SAE 30)	700	Lube Shop
Motor Oil (SAE 30)	100	Processing Plant
Motor Oil (SAE 40)	100	Dock
Mobile Rarus SHC1026	50	Lube Shop
Drive Train Fluid (SAE 50)	400	Lube Shop
Universal Gear Lubricant	250	Lube Shop
Heat Transfer Oil	50	Lube Shop
Heat Transfer Oil	700	Asphalt Plant
Machine Oil	100	Lube Shop
Hydraulic Fluid	500	Lube Shop
Compressor Oil	350	Lube Shop
Rock Drill Oil	250	Lube Shop
Electrical Insulating Oil	250	Lube Shop
Chevron Gear Oil	1,000	Processing Plant
Grease	2,000 pounds	Lube Shop
Grease	20	Asphalt Plant
Grease	40	Processing Plant
Antifreeze	250	Lube Shop
Anti-stripping Agent	600	Lube Shop
Safety-Kleen Aqueous Parts Cleaner	50	Lube Shop
Safety-Kleen Aqueous Parts Cleaner	50	Maintenance Shop
Air Tool Oil	50	Asphalt Plant
Zep Cleaning Fluid	50	Asphalt Plant
Paint/Primer	100	Fabrication Shop
Used Motor Oil	500	Lube Shop
Used Oil Filters	1,500	Lube Shop
Liquid Propane Gas	20,000	Hot Mix Plant
Compressed Gases	40 cylinders	AC control room, Fabrication Shop, Truck Shop

^a Quantities are in gallons unless otherwise specified.
^b Two materials not included in list for security reasons.

SOURCE: The Dutra Group, SRRQ Storm Water Pollution Prevention Plan, updated June 15, 2005

The project site is not listed on any applicable databases which compose the Cortese List. The only listed contamination incident located within a one-mile radius of the Quarry is an underground gasoline tank leak at the Peacock Gap Golf and County Club. This leaking tank incident was closed by Marin County in 1993 and is not expected to have impacted the project site.

Fire Hazards

The degree of fire hazard for an area is dependent on three major components: (1) the natural setting of the wildland or urban area, (2) the degree of human use and occupancy of the wildland or urban area, and (3) the level and ability of public services to respond to fires that do occur. The proposed Marin Countywide General Plan generally characterizes the project site as “moderate” for wildland fire risk. Areas north of Point San Pedro Road are characterized as either “high” or “very high” for wildland fire risk.

Pond Fines

Pond fines refer to the fine materials obtained from the washing of a crushed stone aggregate. During production, the coarser-sized particles range from washing may be recovered by means of a sand screw classifier. The remainder of the fines are discharged to a series of sequential settling ponds or basins, where they settle by gravity.

Generally, fine materials are non-hazardous, but can have chemical and/or physical properties that result in a material that cannot support vegetative growth. A soil survey of pond fines collected on the project site indicated that while some samples could be reclaimed for horticultural use, laboratory analysis showed that other samples contained a salinity, sodium, and boron content that would be toxic to most, if not all, plants (Soil and Plant Laboratory Inc., 2004).

Naturally Occurring Asbestos (NOA)

Naturally occurring asbestos is found in ultramafic rocks, including serpentine. When this material is disturbed in connection with quarrying or surface mining operations, asbestos-containing dust can be generated. Exposure to asbestos can result in health impacts such as lung cancer, mesothelioma (cancer of the linings of the lungs and abdomen), and asbestosis (scarring of lung tissue that results in constricted breathing). Activities associated with quarrying and surface mining in areas known to contain NOA can result in elevated levels of airborne asbestos.

The California Air Resources Board adopted the Asbestos Airborne Toxic Control Measure (ATCM) for quarrying and surface mining operations in November 2002. The ATCM applies to quarrying and surface mining operations that meet any one of the following criteria:

- Any portion of the area to be disturbed is located in a geographic area designated as an ultramafic rock unit or ultrabasic rock unit on maps published by the Department of Conservation.
- Any portion of the area to be disturbed has ultramafic rock, serpentine, or naturally occurring asbestos on the site as determined by the District or the owner or the owner/operator.
- After the start of operation, the local Air Pollution Control District or Air Quality Control District, a registered geologist, or the owner/operator discovers ultramafic rock, serpentine, or naturally occurring asbestos in the area to be disturbed.

The regional geological map generated by the Department of Conservation does not indicate that the project site is located in a geographic area designated as an ultramafic or ultrabasic rock unit

(Wagner, D.L., et. al., 1990). NOA has not been identified to date by the District or Dutra Materials and the ATCM for NOA does not currently apply to SRRQ. As noted in Section 4.2, Air Quality analytical results for samples collected at and in the vicinity of the Quarry in November and December 2007, indicate that asbestos was not detected above the laboratory detection limit of 1% using a visual area estimation technique in the eight samples submitted for analysis.

Crystalline Silica

Crystalline silica was identified as a Toxic Air Contaminant by the Office of Environmental Health Hazard Assessment in February of 2005. Crystalline silica is a component of soil, sand, granite and many other common minerals. Crystalline silica may become respirable size particles when workers chip, cut, drill or grind materials that contain it. If respirable silica dust enters the lungs, it causes the formation of scar tissue (silicosis) which can be disabling or even fatal, reducing the lungs ability to take in oxygen and increasing the susceptibility to lung infections like tuberculosis.

Concentrations of crystalline silica were analyzed in 15 filters collected in 2004 as a part of a County sponsored air quality study. Detectable quantities of crystalline silica were not found in any of the fifteen filters tested. Analysis of dust samples collected to date suggests that measured concentrations of both crystalline and amorphous silica do not represent a health concern relative to human exposure to sampled dust. Further discussion of crystalline silica is provided in Section 4.2, Air Quality.

Diesel Particulate

Operations of diesel trucks and excavation equipment at the Quarry result in emissions of Diesel Particulate Matter (DPM), which was identified by the state of California as a TAC in 1998 because it is a known carcinogen. Concentrations of DPM were monitored over a two month period in 2004 as a part of the County-sponsored air quality study. A monitoring station was established approximately 18 meters from the center of Point San Pedro Road adjacent to residences along Heritage Drive. Concentrations of DPM were estimated by measuring carbon black particulates and polycyclic aromatic hydrocarbons indicator species.

Monitoring indicated spikes in DPM concentrations from 15 to 45 nanograms per cubic meter (ng/m³) regularly occurred during work days at the Quarry, while weekend concentrations were less than 5 ng/m³, indicating that trucks entering and leaving the Quarry were the likely source of DPM emissions in the area. Assessment of risks to nearby sensitive receptors associated with long-term exposure to DPM emissions was not conducted as a part of this study.

The study also included an analysis of the metals content of particulate matter sampled (STI, 2005 and 2006). While this study indicated that the majority of the samples contained metals below detection limits and cancer and non-cancer benchmarks, some samples were found to exceed the cancer benchmarks for arsenic, chromium IV and Nickel subsulfide. These results are to be expected as these metals are contributing components as to why DPM was identified as a toxic air contaminant. Section 4.2, Air Quality contains an analysis of DPM and its potential

impacts on nearby sensitive receptors as a result of the proposed project and so is not discussed further in this Hazards section.

McNear's Brickyard Operations

The McNear's Brickyard facility operates, via lease, in the NW Quadrant of the project site. Kiln operations from the Brickyard result in emissions of hydrogen fluoride (HF), a substance identified as a toxic air contaminant by the state of California. HF is not a known carcinogen, but exposure to high levels of fluoride can result in bones that may be more fragile and brittle than normal, potentially resulting in a greater risk of breaking the bone. Hydrogen fluoride is irritating to the skin, eyes, and mucous membranes, and inhalation may cause respiratory irritation or hemorrhage. Systemic effects can occur from all routes of exposure and may include nausea, vomiting, gastric pain, or cardiac arrhythmia.

In December of 2005 a health risk analysis was performed to assess the incremental health risks to workers and at nearby sensitive receptors resulting from HF emissions of the McNear's Brickyard. Hazard indices were calculated based on modeled emissions from the McNear's Brickyard and local meteorology. Resulting hazard indices for both chronic and acute non-cancer effects were found to be less than BAAQMD significance standards for public notification requirements for both off-site receptors and on-site workers (STI, 2005).

Impacts and Mitigation Measures

Significance Criteria

The California Environmental Quality Act Guidelines (*CEQA Guidelines*) provide standards for determining whether the effects of a potential impact should be considered significant. Appendix G of the *CEQA Guidelines* provides that a project may be deemed to have a significant impact if it would:

- Create a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Result in a safety hazard for people residing or working in the project area (for a project located within the vicinity of a private airstrip or within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport);

- Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan;
- Result in unsafe conditions for employees, visitors, or students; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

As discussed in the Setting, the project is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Furthermore, the project site is not located within the vicinity of a private airstrip or public airport, nor within one-quarter mile of an existing or proposed school. Consequently, the project would have not impact to these issues, and these issues are therefore not discussed further in this Environmental Impact Report (EIR).

This impact analysis focused on potential effects of hazardous materials associated with mining and reclamation activities, and potential wildland fires. All potential effects on air quality associated with the project (including air toxics) are addressed in Section 4.2, Air Quality.

Consistent with policy and guidance provided by the County of Marin EIR Guidelines, Appendix N, an effect of the proposed project would be considered significant if it causes one or more of the following impacts:

- Poses a public health and safety hazard through release of emissions or risk of upset;
- Interferes with emergency response plans or emergency evacuation plans;
- Exposes sensitive receptors to substantial pollutant concentrations;
- Results in unsafe conditions for employees, visitors or students.

Impacts of the Amended Reclamation Plan

Impact R4.8-1: Hazardous materials transported or used onsite during proposed mining and reclamation activities (i.e., petroleum products,) could be spilled or otherwise released through improper handling or storage (Significant).

Proposed mining and reclamation activities may involve the use of certain hazardous substances and/or petroleum products. Inadvertent release of these materials could result in adverse impacts to soil, surface water, and/or groundwater. The onsite storage and use of large quantities of materials capable of impacting soil and groundwater primarily consist of gasoline and diesel fuel stored in aboveground storage tanks. The implementation of appropriate best management practices is required pursuant to existing permits (e.g., National Pollutant Discharge Elimination System and Hazardous Materials Business Plan permits for mining and reclamation activities).

Adherence to existing federal, state, and local laws and regulations, including requirement that a Spill Prevention, Control and Counter Measure Plan (SPCCMP) be prepared for mining

operations would reduce the potential impact of releases of hazardous materials to a less than significant level.

Explosives are stored and used on site. While blasting materials are transported to and used at the Quarry, this is in relation to quarrying activities and not as a result of proposed reclamation activities. Therefore, storage and use of explosives is not a consequence of the proposed ARP.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.8-1a: SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.

Mitigation Measures Identified in this Report

Mitigation Measure R4.8-1b: SRRQ shall maintain and periodically update its Hazardous Material Business Plan during the entire reclamation period.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.8-1: Review of the Hazardous Materials Business Plan will be the responsibility of the Marin County Department of Public Works.

Level of Significance after Mitigation

Less than Significant.

Impact R4.8-2: Reclamation activities at the project site could expose structures, on-site workers, and nearby residents to hazards associated with wildland fires (Less than Significant).

As discussed above, the Marin County General Plan does not designate the project site as an area containing a high potential for large wildland fires. Nevertheless, residences located north of the Quarry are characterized as either “high” or “very high” for wildland fire risk. The project would involve continued industrial operations on a largely undeveloped site. The project would involve the daily movement of construction vehicles within the site during the 8-10 week period of reclamation activities each dry season. This would take place in the vicinity of vegetated areas, including grasslands and eucalyptus groves. Operation of equipment near vegetation during the dry season could potentially increase the possibility of ignition of a fire.

The project would be required to comply with all County of Marin rules, regulations, and guidelines to minimize wildland fire hazards. Therefore this impact is considered less than significant, and requires no mitigation. See also, Section 4.9, Public Services, Utilities, and Energy in this EIR for additional discussion on potential impacts to fire protection services.

Mitigation: None required.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.8-3: Transport, storage, and use of explosives could result in accidental explosions or exposure to hazardous substances (Significant).

Explosives are and would continue to be stored and used on site. Blasting materials are regularly transported and used at SRRQ, and this could be considered potentially hazardous. However, the transport of blasting materials to the site is restricted by the California Highway Patrol to pre-approved routes, and all explosive transport vehicles must satisfy all the stringent vehicle standards as required by the Federal Department of Transportation. Once explosives enter the site, their transportation and use is regulated by the Federal Occupational Safety Administration and by Cal OSHA. All blasting is and would continue to be conducted in compliance with applicable federal and state blasting regulations. Blasting is and would continue to be conducted by a qualified blasting expert. While these regulatory measures and ongoing practices are sufficient to reduce to an acceptable level the hazards from transport, storage, and use of explosives, the absence of a plan that clearly describes how the Quarry will consistently comply with these regulations and measures leaves the potential for a significant impact.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.8-3a: As previously described under Mitigation Measure R4.8-1a, SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.

Mitigation Measures Identified in this Report

Mitigation Measure P4.8-3b: The applicant shall prepare and maintain a blasting plan that describes how the Quarry will consistently comply with applicable blasting regulations and standards of practice. The blasting plan will contain a complete description of clearing and guarding procedures; descriptions of how explosives will be safely transported, stored, and used at the site in accordance with applicable regulations; evacuation, security and fire prevention procedures; blasting equipment list, and procedures for notification of nearby receptors in the event of an accident or emergency involving explosives. The blasting plan shall incorporate the recommendations contained in the Revey Associates, Inc. report (pp. 23-24) attached as Appendix J. The blasting plan must be prepared within six months of approval of the AQP. The plan will be subject to review and approval by the County Department of Public Works.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.8-3: The Marin County Department of Public Works will be responsible for review and approval of the blasting plan.

Level of Significance with Mitigation

The adoption of and adherence to a blasting plan that meets the above-stated criteria will reduce this impact to a less than significant level.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

The foregoing discussion identifies potentially significant impacts of the ARP and AQP associated with transport, storage, and use of hazardous materials. However, both of these impacts can be mitigated to less-than-significant levels with the incorporation of specified mitigation measures. After mitigation, the residual significance of the impacts is so slight that there is no possibility that they could combine to create a cumulatively significant impact.

References – Hazards and Hazardous Materials

Bay Area Air Quality Management District, *Results of AB2588 Health Risk Analysis for McNear Brick & Block, Hydrogen Fluoride Emissions (Kiln Exhaust)*, interoffice memorandum from Daphne Y. Chong to Brenda Cabral, December 23, 2005.

California Code of Regulations, Title 22 and Title 23, as amended.

California Department of Toxic Substances Control, official website, www.dtsc.ca.gov.

Dutra Materials, *Proposal for Administrative Review of Mining Permit for San Rafael Rock Quarry*, October 27, 2004(a).

RTI International, written communication to Paul Roberts, Sonoma Technology, Inc., August 14, 2006.

Soil and Plant Laboratory, Inc., *Soil Study to Evaluate Suitability for Vegetative Growth*, prepared for San Rafael Rock Quarry, August 3, 2004.

Sonoma Technology, Inc., *Results of Air Quality Monitoring near the San Rafael Rock Quarry*, prepared for the Marin County Community Development Department, 2005.

Wagner, D.L., Bortugno, E.J., and McJunkin R.D., *Geologic Map of the San Francisco – San Jose Quadrangle*, 1990.

4.9 Public Services, Utilities, and Energy

This section discusses public service issues, including the proposed project's relationship to existing schools, police, fire, park, power suppliers and other public services provided to unincorporated areas of Marin County. Water supply, wastewater treatment, and solid waste disposal requirements for the San Rafael Rock Quarry (SRRQ) are also covered here. Applicable project impacts and mitigation measures are presented and discussed. Storm drainage at the site will be addressed in Section 4.5, Hydrology and Water Quality.

Setting

Fire Protection and Emergency Medical Service

Fire Protection services within San Rafael are provided by the City of San Rafael Fire Department (SRFD) and the Marin County Fire Department. While the site is under the jurisdiction of the County of Marin and Marin County Fire Department, a mutual aid agreement exists between the two entities, and the area covered by the agreement is referred to as County Service Area (CSA) 19. These fire departments maintain mutual aid agreements with other adjacent fire departments. Although the Quarry is in an unincorporated area of the County, the SRFD operates a station nearby and would be the first responder. The SRFD currently contains 90 professionals trained in specialties including emergency medical care, firefighting, hazardous materials and emergency preparedness (Buscher, 2006; City of San Rafael, 2006).

Firefighters within the City's fire department are responsible for the protection of life and property through firefighting activities, emergency medical services, fire prevention and community fire servicing. Major activities the fire department conducts include: training and support for fire suppression services, educating businesses and residents on how to ensure safe work environments and homes, participating in inspection activities, conducting supervised drills and training, and conducting routine maintenance of equipment, apparatus and stations (City of San Rafael, 2006).

Approximately 70 percent of the emergency calls that come into the SRFD are for medical-related needs. All SRFD firefighters are EMT (Emergency Medical Trained) Fire Service-certified and EMT defibrillator-certified. In addition, many of the SRFD personnel are paramedic-certified (EMT-P) and Advanced Cardiac Life Support-certified for delivery of advanced emergency medical care (City of San Rafael, 2006; Mark, 2006).

There are three fire stations within the general vicinity of the project site. The SRFD station of first response to the project site is Fire Station Number 5, located approximately one mile west of the site at 955 Point San Pedro Road. Response time to the project site from this nearest fire station is typically 5 to 10 minutes. Personnel housed at each of the stations include one captain, one engineer and one firefighter. Fire Station Number 5 personnel and equipment also includes one medic and an ambulance. Fire Stations 2 and 1 would be stations of second and third response, respectively. Station Number 2 is located at 210 Union Street. Station 1 is located at

1039 E Street and has two medics on staff (Mark, 2006). Several fire hydrants are located on Point San Pedro Road. There is currently adequate high pressure (approximately 90 psi) for fire flow to these hydrants (Una Conkling, 2006).

Water and water distribution lines for fighting fire in the project area are provided by the Marin Municipal Water District (MMWD). The SRFD requires the MMWD to maintain adequate fire flow in all areas within the City where it provides fire fighting water infrastructure (Mark, 2006).

The San Rafael General Plan 2000 contains a number of goals and policies regarding emergency response and planning. Specific policies include the following:

S-26 Emergency Response. Provisions will be made to continue essential emergency public services during natural catastrophes.

S-27 Disaster Preparedness Planning. Disaster Preparedness planning will be undertaken in cooperation with other public agencies and appropriate public-interest organizations.

Police Protection

Unincorporated areas of Marin County, such as the San Rafael Rock Quarry, remain under the jurisdiction of the Marin County Sheriff's Department. The Sheriff's Department also maintains a mutual aid agreement with the San Rafael Police Department (SRPD) for emergency response. Police protection and traffic enforcement within the city San Rafael is provided by the SRPD, located at City Hall, at 1400 Fifth Avenue in San Rafael. Upon request by the Sheriff's Department, the SRPD can respond to emergencies at the project site. The SRPD is supplied with additional assistance from adjacent law enforcement agencies; regional or statewide sources are also available, as necessary. Response time to the project site from the SRPD is typically between three and five minutes (Taylor, 2001).

Under the C.O.P.S. (Community Oriented Public Service) strategy, the San Rafael Police Department maintains several units. The Uniformed Patrol Bureau (UPB) of SRPD provides uniformed police services 24 hours a day. The bureau is divided equally into two sub-units of approximately twenty members, the Footbeat Unit and a Directed Patrol Unit (DPU) managed by police lieutenants. The Bureau is primarily engaged in emergency response, crime suppression, traffic enforcement, initial criminal investigation and a commitment to community policing. The Traffic Bureau of the SRPD implements a number of traffic and parking-related programs. This unit has five police motorcycle officers under the supervision of a police sergeant. Their duties include traffic enforcement and public awareness programs. The Ranger/Marine unit, responsible for enforcement in parks, open spaces, and waterways is included in this unit. In addition to supervision, the Sergeant conducts parking citation and vehicle tow hearings and represents the Department in the planning and handling of special events. The Criminal Investigations Unit is responsible for investigation of major crimes. The SRPD also maintains an Administration/Investigation Bureau, which includes crime investigative units and police dispatching (City of San Rafael, 2006).

The California Highway Patrol (CHP) has jurisdiction and law enforcement powers on all County roads and State highways outside the incorporated cities. The CHP's Marin County office is located in Corte Madera. The CHP's Golden Gate Communications Center in Benicia is the dispatch center for the Marin office (California Highway Patrol, 2006).

Electricity and Natural Gas

Pacific Gas and Electric Company (PG&E) currently maintains electrical lines and a 6 inch gas main on the project site. Electrical service to the project site includes 12.5 KV, 4160 V and 480 V in both overhead and underground lines. Overhead electrical lines are present along Point San Pedro Road and enter the project site at the main Quarry entrance. The gas main enters the site via McNear's Brickyard, which also receives these services (Kirtley, 2006; Steger, 2006). Electricity on the project site is used to power motors and lighting. Natural gas is used to heat aggregates for asphalt production. Equipment used on the project site includes crushers, screens for sizing, conveyors, and the asphalt plant (Kirtley, 2006).

Water Supply

The San Rafael Rock Quarry currently maintains a service connection to the Marin Municipal Water District (MMWD), a public agency that provides drinking water to 190,000 people in a 147-square-mile area of south and central Marin County. The MMWD provides potable water service and fire flow within its service district. In the project vicinity, MMWD provides a 10-inch main water line, which is located on Point San Pedro Road adjacent to the site (MMWD, 2006; Conkling, 2006). While the MMWD collects the majority of its water from within the County, it also receives an allotment from the Sonoma County Water Agency (SCWA). The SCWA serves as the wholesale supplier of water for retail contractors in Sonoma and Marin Counties. The MMWD water allotment from the SCWA is currently 14,300 acre feet, which accounts for approximately 25 percent of total supply for MMWD. However, actual delivery is limited to 8,000 acre feet due to pipeline capacity (Conkling, 2006).

Water from the MMWD is used in the residences located on the project site. The current annual entitlement to the Quarry is 17.13 acre feet, amounting to an average of approximately 465,000 gallons per month (Conkling, 2006).

Water is also used to mitigate dust during operation of the Quarry. Water used for this purpose is collected during the rainy season in an open pond located at the bottom of the Main Quarry Bowl and pumped out on demand throughout the year (Kirtley, 2006).

Sewage Disposal

The San Rafael Sanitation District (SRSD), maintains its own wastewater collection system, and pumps its wastewater to a regional treatment plant operated by the Central Marin Sanitation Agency (CMSA), located at 1301 Andersen Drive in the City of San Rafael. The treatment plant

also receives wastewater from the City of Larkspur and two other sanitation districts in Marin County. In 2005, the SRSD generated approximately 3.4 mgd¹ of wastewater (Cole, 2006).

The Quarry is outside of the boundaries of the SRSD and so does not access a public sewer line. Although there is a private sewer line, a 6-inch vitrified clay pipe, on Cantera Road leading to McNear's Beach County Park (Hernandez, 2006), the only sanitation district-maintained sewer line in the vicinity of the Quarry is a six-inch diameter sewer line on Point San Pedro Road which provides sewer services to the neighboring Peacock Gap Neighborhood.

There are currently ~~two~~ three operating septic systems which serve the residential quarters on the project site for which permits were issued in 1983 or later. The systems are ~~both~~ standard gravity systems with leach fields. One of the systems serves two residential quarters, a main house and guest house. There is also a second guest cottage that is served by its own tank and leach field. The Quarry constructed a new caretaker's residence with septic tank and leachfield that was completed with required County permits in 2007. The operational lifetime for septic systems is generally thought to be 20 years. The septic systems currently serving the site passed an evaluation by the Marin County Environmental Health Services Department in 2004. An application has been filed for upgrades which would include the installation of a new system on the main house.

Solid Waste Generation and Disposal

The nearest landfill to the project site is the Redwood Sanitary Landfill in Novato, which received a total of 338,533 tons of waste in 2005, of which 144,103 originated from within Marin County. (California Integrated Waste Management Board [CIWMB], 2007).

Assembly Bill 939 (AB 939), enacted in 1989 as the California Integrated Waste Management Act, requires each city or county's source reduction and recycling element to include an implementation schedule which shows both of the following: a 25 percent diversion of all solid waste from landfill disposal or transformation by January 1, 1995, through source reduction, recycling, and composting activities, followed by a 50 percent reduction to the waste stream by January 1, 2000.

In accordance with AB 939, the Source Reduction and Recycling Element of Marin County's Integrated Waste Management Plan outlines a course of action for meeting the state's mandate through source reduction, recycling, and composting (Marin County, 1994). The diversion rate for Marin County in 2004 was 77 percent. The Concrete, Asphalt, and Rubble Program under the Marin County Hazardous and Solid Waste Management Authority, represents the means by which recycled materials would be substituted for newly mined aggregate (CIWMB, 2006). Under this program, Quarry operations may include the recycling of old concrete, asphalt and building materials that are crushed and then mixed with crushed rock and sold as road base material. While sand is brought to the Quarry from off-site for use in asphalt production, no gravel, materials for recycling, or dredged materials are currently brought to the site.

¹ Average Dry Weather Flow (in millions of gallons per day) for 2005.

Countywide Plan Update 2007 Policies

Consistency of the ARP and AQP with relevant policies of the Marin Countywide Plan Update is discussed in Section 4.6, Land Use and Planning.

Impacts and Mitigation Measures

Significance Criteria

A project would normally have a significant adverse impact on public services, utilities, or energy resources if it:

- substantially increased demand for fire or police protection services;
- exceeded available water supplies, resulting in the need for new or expanded entitlements;
- required or resulted in the construction of new or expanded public water services, wastewater collection infrastructure, solid waste management facilities, electrical generation facilities, gas supply, or communications infrastructure; or
- encouraged activities that would result in the unnecessary use of energy or used fuel or energy in an inefficient or wasteful manner. *CEQA Guidelines* Appendix F underscores the importance of energy conservation.

Impacts of the Amended Reclamation Plan

Impact R4.9-1: The project would require fire protection and emergency medical services from the Marin County Fire Department and the San Rafael Fire Department (Less than Significant).

Implementing the proposed site reclamation could require response by the City of San Rafael Fire Department (SRFD) and the Marin County Fire Department (MCFD) for fire protection and medical emergencies. Response by the SRFD to the project and project site would be primarily due to calls associated with structural fires, on-or off-site vehicular accidents, and medical emergencies. Both the SRFD and MCFD are multidisciplinary, and depending on the type, size and location of the emergency, and staffing and equipment availability of the emergency services at the time, both could respond to all potential fire protection and medical responses. Based on the project characteristics, the proposed project is not likely to create a significant demand for fire protection services or additional personnel for either the MCFD or the SRFD.

The proposed project would not substantially hinder the SRFD's ability to provide adequate fire and emergency medical services to the project site or to other locations under their jurisdiction. Similarly, any potential effects to the MCFD's fire protection services are not expected to be adverse. Thus, the project's effects on fire protection services, including potential contribution to cumulative demand for fire protection services, would be less than significant, and no mitigation is required.

Mitigation: None required.

Impact R4.9-2: The project would require police protection and traffic enforcement services of the Marin County Sheriff's Department and the San Rafael Police Department (Less than Significant).

Operation of the proposed project could require response by the Marin County Sheriff's Department and the San Rafael Police Department for typical police protection services (e.g., for traffic enforcement, traffic control in the event of vehicular accident, trespassing/vandalism, etc.). The proposed project would not prevent the Department from providing adequate law enforcement services to the site, or require any new or physically altered facilities because of the proposed development. Similarly, potential effects to the California Highway Patrol along Point San Pedro Road are not expected to be adverse. Thus, the project's effect on police protection services, including potential contribution to cumulative demand for police protection services, would be less than significant, and no mitigation is required.

Mitigation: None required.

Impact R4.9-3: The project could place burdensome demands on public water supplies, exceeding available capacity, especially during periods of drought (Less than Significant).

The project site is currently served by the Marin Municipal Water District (MMWD). As described above, water used to mitigate dust and for other operations is collected during the rainy season in an open pond located at the bottom of the Main Quarry Bowl and pumped out on demand throughout the year. Use of water from this source will also provide a source of non-potable water for site reclamation activities. Demand for non-potable water created by the additional grading and revegetation activities would incur greater water expenditures, but would not require new services or increased allocation beyond that which is already supplied to the Quarry to serve existing operations.

Marin County consumes 37,690,000 gallons of water per day; estimated per capita water consumption for the County is 152 gallons per day (USGS, 2000). Total water supply for MMWD is currently 18,638,701,904 gallons per year, or 51,064,936 gallons per day (Conkling, 2006). Under the proposed post-reclamation use of the Quarry site, a total of 102.9 residential acres supporting 2 to 4 single family housing units per acre² would be built at the site following reclamation. Using the Association of Bay Area Governments (ABAG) population projection of

² As detailed in the 1994 Marin County General Plan, Community Development Element, Policy CD-11.2, Point San Pedro.

2.36 people per single family unit³, the projected post-reclamation residential population at the project site can be estimated to be 485 to 970 persons. Considering this, and assuming per capita water consumption of 152 gallons per capita per day, post-reclamation use would create demand for 73,720 to 147,440 gallons per day or 26,907,800 to 53,815,600 gallons per year for residential uses alone. Under current conditions, the Marin Municipal Water District supplies approximately 465,000 gallons per month, or 5,580,000 gallons of water per year to the project area. The proposed post-reclamation use would increase demand for water for the project area by approximately 1,777,317 to 4,019,633 gallons per month; the resulting demand associated with residential uses alone would represent 0.1 percent to 0.3 percent of MMWD's total supply. However, this does not differ from the demand for water that would be created by the post-reclamation use specified in the 1982 Amended Reclamation Permit (ARP82).

The issue of water supply will be further examined during review of the Quarry's Development Plan, which is to be prepared three years prior to the anticipated cessation of quarrying activities.

Mitigation: None required.

Impact R4.9-4: Post-reclamation development would require system upgrades and new service connections and place additional demands on wastewater treatment facilities (Less than Significant).

Although the project site is not currently served by wastewater collection infrastructure, the conversion to residential and commercial land uses following reclamation would create the demand for public waste water services. As such, there could be an impact from the project on existing public wastewater facilities.

Assumptions regarding post-reclamation wastewater generation are based on the applicant's post-reclamation development concept for as many as 350 residential dwelling units. This density was used for analysis of post-reclamation development impacts as a worst case assumption, but policies of both the 2007 Marin Countywide Plan Update (CWP 2007) and the San Rafael General Plan 2020 require a traffic analysis at the time future development is proposed to determine the road capacity and traffic levels from any dwelling unit density greater than the minimum 75 dwelling units identified in the CWP 2007 that might be accommodated at that time. The projected demand does not differ from the demand that would be created by the post-reclamation use previously specified in the ARP82. The issue of wastewater generation will be further examined during review of the final Development Plan, which is to be prepared three years prior to the anticipated cessation of Quarry activities.

This analysis uses a method to calculate wastewater treatment demand based on water usage, assuming that approximately 75 percent of water consumed will require treatment. The

³ The average household size for census tract 1104, which includes the Peacock Gap Neighborhood, is 2.51 (US Census, 2000); however, because the ABAG estimate projects population to the year 2020, it was thought to represent a more precise estimate for this analysis.

residential component of the proposed post-reclamation use could create demand for 73,720 to 147,440 gallons of water per day (gpd) (see Impact R4.9-3), which would require treatment of approximately 55,290 to 110,580 gpd of wastewater. In 2005, the average dry weather daily flow from the San Rafael Sanitation District (SRSD) to the Central Marin Sanitation District (SMSD) was 3.4 million gallons per day (Cole, 2006). The increased demand for wastewater treatment from the proposed post-reclamation use of the project site would represent 1.6 percent to 3.3 percent of the current demand generated by the entire SRSD. The CMSD has a dry weather treatment capacity of 10 million gpd, and projected development through 2020 would increase wastewater flows by about 12 percent, or by 1 million gpd during dry weather and 13 million gpd during wet weather (San Rafael General Plan 2020, Infrastructure Element, p. 203). There is also currently an expansion project underway at the CMSD which will increase capacity of the treatment plant to meet future demand. As the additional demand for water treatment incurred by the Quarry ARP is within the projected future capacity of the Central Marin Sanitation Agency, the proposed project would not pose a significant impact to public treatment facilities.

Mitigation: None required.

Impact R4.9-5. The project would generate solid waste and place a greater demand upon landfill capacity (Less than Significant).

Reclamation activities are not expected to generate substantial quantities of solid waste. Post-reclamation use of the Quarry site, including residential, commercial, and marina development, would result in substantial generation of solid waste. These uses, and the consequent volume of materials generated, do not differ from those projected under ARP82. Furthermore, it is expected that new businesses and residences will be served with municipal solid waste and recycling services, and that construction and demolition activities associated with post-reclamation development will be subject to current waste reduction and recycling requirements. These aspects of post-reclamation development will be further examined in the review of the Development Plan, which is to be submitted to the County three years prior to the anticipated cessation of quarrying.

Mitigation: None required.

Impact R4.9-6: Reclamation activities and intended post-reclamation development would increase demand for electricity and natural gas and involve greater energy expenditures (Less than Significant).

On site vehicle related expenditures constitute the bulk of energy demand related to quarry activity. Currently, the Quarry operates eight haul trucks, seven front-end loaders, three excavators, one bulldozer and one rock drill for a combined total of 15,950 annual hours. Reclamation-related activities such as earth moving (cut and fill), grading and revegetation are

anticipated to add to the on-site vehicle fleet (see Section 4.2, Air Quality, for an inventory of expected reclamation equipment).

PG&E electrical lines extend to the project site from Point San Pedro Road. It is assumed that existing PG&E electrical facilities serving the immediate project vicinity (e.g., electrical lines, transformers, etc.) currently have adequate capacity to power the proposed pre-development reclamation activities, such as water pumping. However, the proposed future residential and commercial developments at the project site would generate energy demand and entail multiple new gas and electric service connections. The specific electrical loading and service requirements of the proposed project shall be determined by PG&E after the project applicant submits a formal application for electrical service. At that time, PG&E would review the proposed project and identify what additional on- and/or off-site electrical requirements would be needed to deliver electrical service to the site. These aspects of post-reclamation use will be further examined in the review of the Development Plan, which will be submitted three years prior to the anticipated cessation of quarrying. This review should include compliance of the proposed development with County policies regarding energy conservation and alternative energy generation.

Mitigation: None required.

Impacts of the Amended Surface Mining and Quarrying Permit

Potential impacts of the Amended Surface Mining and Quarrying Permit to public services, utilities, and energy were examined in the San Rafael Rock Quarry Amended Surface Mining and Quarrying Permit Initial Study and determined to be less than significant.

Cumulative Impacts

Please refer to Chapter 5, Growth-Inducing and Cumulative Effects, for consideration of all applicable cumulative impacts to public services, utilities, and energy.

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4.10 Transportation and Traffic

This section analyzes the potential for the Amended Reclamation Plan (ARP) to adversely affect transportation (traffic flow and congestion, traffic and bicycle/pedestrian safety, and road wear) through increased traffic volumes generated by the proposed project.

Setting

Access roadways

The project site and surrounding roadway network are presented in Figure 4.10-1. Access for the project site is via private roads that intersect with Point San Pedro Road, approximately four miles east of U.S. 101.

Regional Access

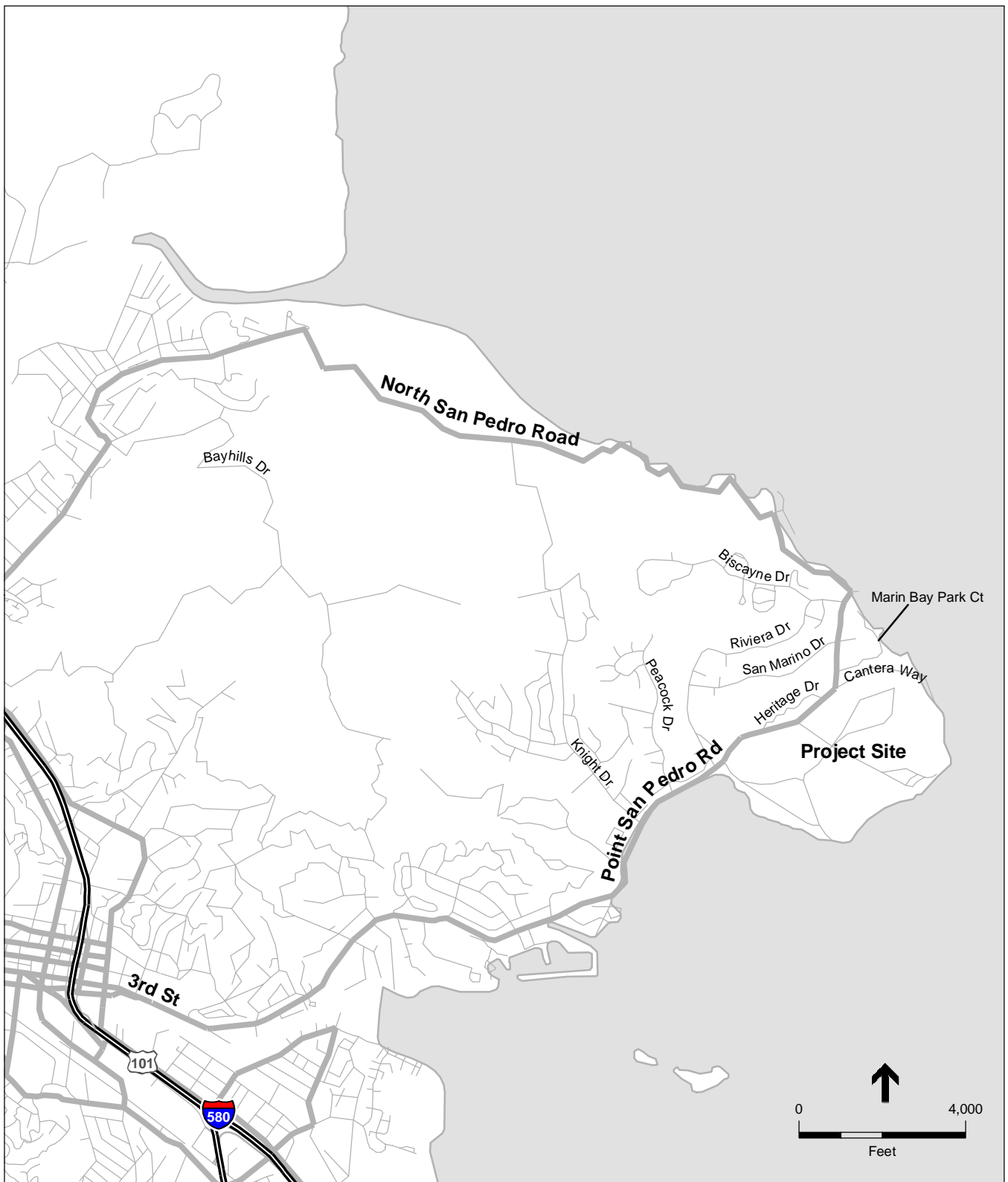
U.S. Highway 101 (U.S. 101) provides most-direct regional access for the San Rafael Rock Quarry (SRRQ) (via the U.S. 101 / Central San Rafael interchange [ramps connecting with Irwin Street and Hetheron Street at Second Street and Mission Avenue]). U.S. 101 extends north to Sonoma County and beyond, and south to San Francisco County and beyond. In the project area, U.S. 101 is a six-lane freeway, with access restricted to on- and off-ramps at interchanges. The latest data from Caltrans indicates that the average annual daily traffic on this section of Highway 101 is about 132,000 vehicles (Caltrans, 2006). Trucks represent about 3.5 percent of total traffic (Caltrans, 2005).

Interstate 580 (I-580) also provides regional access for the area, intersecting with U.S. 101 in southern San Rafael and connecting to East Bay communities via the Richmond-San Rafael Bridge.

Local Access

Point San Pedro Road is primarily a four-lane divided roadway that, as a continuation of the one-way couplet of Third and Second Streets, provides direct access to the project site; east of Riviera Drive, it narrows to two lanes undivided past, and east of, the Quarry access. The travel lanes on Point San Pedro Road are 12 feet wide, and there are 7- to 8-foot-wide paved shoulders. The shoulders are used by bicyclists and, in some areas, for parking. Intersections on Point San Pedro Road are unsignalized (with stop-sign control on the side streets, and left turn lanes on Point San Pedro Road), except at its intersection with Lochinvar Road / Loch Lomond Drive, which is signalized (with left turn lanes and pedestrian crossing signals, too).¹ The posted speed limit on Point San Pedro Road, east of Mooring Drive, is 35 miles per hour (mph), except in a

¹ The traffic signal at Point San Pedro Road / Lochinvar Road – Loch Lomond Drive is demand-responsive, meaning the light stays green for vehicles on Point San Pedro Road unless a vehicle on the side street “actuates” a change to stop vehicles on Point San Pedro Road long enough for the vehicle on Loch Lomond Drive to cross or turn onto Point San Pedro Road.



SOURCE: ESRI, 2007

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.10-1
Roadways Around Project Site

school zone for San Pedro Elementary School, where the speed limit is 25 mph when children are present. West of Mooring Drive (where the road name changes to Third Street) to U.S. 101, the posted speed limit is 25 mph. The intersections on Third and Second Streets near U.S. 101 (at Union Street, Grand Avenue, Irwin Street, and Hetherton Street) are signalized.

Existing Traffic Conditions

Level of Service Analysis Methodologies

The operation of a local roadway network is commonly measured and described using a grading system called Level of Service (LOS). The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of vehicle traffic, ranging from LOS A (indicating free-flow traffic conditions with little or no delay experienced by motorists) to LOS F (indicating congested conditions where traffic flows exceed design capacity and result in long delays). This LOS grading system applies to both roadway segments and intersections. Marin County and the City of San Rafael have established LOS D as the generally acceptable service level standard at most intersections throughout their jurisdictions. The City of San Rafael's LOS D standard applies citywide, except at ~~downtown~~ the following locations, where the standard is LOS E, ~~and at the intersection of Mission Avenue / Irwin Street, where the standard is LOS F:~~

- Downtown intersections (except at the intersection of Mission Avenue / Irwin Street, where the standard is LOS F), and the intersections of Irwin Street and Grand Avenue between Second Street and Mission Avenue, Third Street / Union Streets (maximum 70 seconds of delay during peak hours), Andersen Drive / West Francisco Boulevard, Andersen Drive / Bellam Boulevard, Manuel T. Freitas Parkway / Civic Center – Redwood Highway, Merrydale Road / Civic Center Drive, and Merrydale Road / Las Gallinas Avenue.

Signalized Intersections

At signalized intersections, traffic conditions are evaluated using the 2000 *Highway Capacity Manual* operations methodology (TRB, 2000). The operation analysis uses various intersection characteristics (e.g., traffic volumes, lane geometry, and signal phasing/timing) to estimate the average control delay experienced by motorists traveling through an intersection.² Table 4.10-1 summarizes the relationship between control delay and LOS.

Unsignalized Intersections

For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, traffic conditions are evaluated using the 2000 *Highway Capacity Manual* (HCM) operations methodology. With this methodology, the LOS is related to the total delay per vehicle for the intersection as a whole (for all-way stop-controlled intersections), and for each stop-controlled movement or approach only (for side-street stop-controlled intersections). Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle

² Control delay, which is the portion of total delay attributed to traffic signal operation for signalized intersections, includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The use of control delay as the basis for defining LOS differs from earlier versions of the *Highway Capacity Manual* methodology, which used "stopped delay" (i.e., a portion of the total control delay) to define LOS.

departs from the stop line. This time includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. Table 4.10-1 summarizes the relationship between delay and LOS.

**TABLE 4.10-1
DEFINITIONS FOR INTERSECTION LEVEL OF SERVICE**

Unsignalized Intersections		Level of Service Grade	Signalized Intersections	
Description	Average Total Vehicle Delay (Seconds)		Average Control Vehicle Delay (Seconds)	Description
No delay for stop-controlled approaches.	≤10.0	A	≤10.0	Free Flow or Insignificant Delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
Operations with minor delay.	>10.0 and ≤15.0	B	>10.0 and ≤20.0	Stable Operation or Minimal Delays: Generally occurs with good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay. An occasional approach phase is fully utilized.
Operations with moderate delays.	>15.0 and ≤25.0	C	>20.0 and ≤35.0	Stable Operation or Acceptable Delays: Higher delays resulting from fair signal progression and/or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
Operations with increasingly unacceptable delays.	>25.0 and ≤35.0	D	>35.0 and ≤55.0	Approaching Unstable or Tolerable Delays: Influence of congestion becomes more noticeable. Longer delays result from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
Operations with high delays, and long queues.	>35.0 and ≤50.0	E	>55.0 and ≤80.0	Unstable Operation or Significant Delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.	>50.0	F	>80.0	Forced Flow or Excessive Delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.

SOURCE: Transportation Research Board, Special Report 209, *Highway Capacity Manual*, updated 2000.

Existing Traffic Volumes and Intersection Levels of Service

Table 4.10-2 presents baseline levels of service at intersections in the study area during the weekday a.m. and p.m. peak-hours.³ All study intersections currently operate at LOS D or better, except the intersections of Second Street / Grand Avenue and Second Street / Hetherton Street, which currently operate at LOS E during the p.m. and a.m. peak hour, respectively. As stated above, however, the City of San Rafael considers LOS E acceptable at these locations.

**TABLE 4.10-2
 EXISTING INTERSECTION LEVEL OF SERVICE (LOS) AND DELAY (seconds/vehicle)**

No.	Intersection	Traffic Control	Existing AM		Existing PM	
			LOS	Delay	LOS	Delay
#1	Point San Pedro Road / SRRQ Access	Side-Street Stop	B	10.3	A	9.7
#2	Point San Pedro Road / Lochinvar Road	Signal	A	4.9	A	4.8
#3	Third Street / Union Street	Signal	C	30.4	D	45.9
#4	Third Street / Grand Avenue	Signal	B	17.9	C	21.3
#5	Second Street / Grand Avenue	Signal	C	30.1	E	57.4
#6	Third Street / Irwin Street	Signal	C	26.1	D	42.4
#7	Second Street / Irwin Street	Signal	C	21.2	D	38.6
#8	Third Street / Hetherton Street	Signal	D	40.8	D	37.1
#9	Second Street / Hetherton Street	Signal	E	62.3	D	40.7

NOTE: The LOS/Delay for Side-Street Stop-Control intersections represent conditions for the worst movement or approach; for Signalized intersections, the LOS/Delay represent average conditions for the overall intersection.

SOURCES: City of San Rafael (adapted from *Loch Lomond Traffic Impact Study* update, prepared by W-Trans Transportation Consultants), September 2005; and ESA (based on traffic counts conducted at Intersection #1 for this EIR).

Public Transit

There is no public transit service on Point San Pedro Road. Golden Gate Transit Bus Route 32 previously ran on the road once per hour, but that service was eliminated in December 2005.

Pedestrian and Bicycle Traffic

Pedestrian facilities are comprised of sidewalks, crosswalks, and pedestrian signals. Point San Pedro Road (and its continuation as Third and Second Streets) has continuous sidewalks, and has marked crosswalks at most of the intersections, with “Pedestrian Crossing” warning signs at many of them.

³ As defined by the City of San Rafael, baseline conditions represent existing traffic plus estimated traffic generated by approved, but not yet developed or operating, projects.

Bicycle facilities are typically categorized as separated bike paths (Class I), striped and signed bike lanes (Class II), or bike routes that share the road width with motor vehicles (Class III). There are currently no improved bicycle lanes on Point San Pedro Road, though as described above, there are 7- to 8-foot-wide paved shoulders that are used by bicyclists and, in some areas, also used for parking. The City of San Rafael *General Plan 2020* identifies Point San Pedro Road as a road where Class II on-street bicycle lanes are planned in the future.

The Marin Countywide Plan Update (2007)

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to transportation and traffic are discussed in Section 4.6, Land Use and Planning.

Impacts and Mitigation Measures

Significance Criteria

According to Appendix G of the California Environmental Quality Act Guidelines (CEQA *Guidelines*), a project would generally have a significant effect on transportation conditions if it would:

- a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);
- b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- e) Result in inadequate emergency access;
- f) Result in inadequate parking capacity;
- g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

In addition to the above-listed criteria from Appendix G, the following criteria are derived from County supplemental requirements and common engineering practice to apply to the project-specific analysis presented herein:

- Cause the level of service at a signalized intersection to worsen from LOS D or better to LOS E or F, or cause conditions at an unsignalized intersection to warrant installation of a traffic signal;
- Cause the level of service on a regional roadway to worsen from LOS D or better to LOS E or F, or cause the peak-hour peak-direction traffic volume to increase by more than three percent or more on a regional roadway that would operate at LOS F without the Proposed Project;
- Result in projected parking demand that would exceed the proposed parking supply on a regular and frequent basis;
- Result in potential conflicts for pedestrians or bicyclists;
- Increase transit demand above the levels provided by local transit operators or agencies;
- Cause substantial damage or wear of public roadways by increased movement of heavy vehicles.

Impacts of the Amended Reclamation Plan

Impact R4.10-1: The project would generate vehicle trips as a result of reclamation activities being conducted simultaneous with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan (ARP82) (Less than Significant).

The proposed amended reclamation plan would result in reclamation activities being conducted during the remaining operational life of the quarry, instead of at the end of quarrying activities, as contemplated in ARP82. As described in Chapter 3, Project Description, including Table 3-3, re-grading activities are expected to involve cut and fill quantities that would result in a net zero materials balance (i.e., all cut material would be used as fill at the project site, and no new fill would need to be imported to the site). The possible exception to that condition could be during the final Phase 4 when any excess cut material would be sold as quarry or fill products (i.e., subject to the operating conditions that control the number of vehicles that can travel to and from the quarry per day and during peak traffic periods).⁴ It is anticipated that equipment used for reclamation grading work would arrive at and depart from the site at the start and end of the annual construction period, and that equipment would not leave the site during the 8- to 10-week period. It is also expected that workers operating the equipment used for reclamation grading work would consist of regular quarry employees (i.e., no additional workers would be employed). As such, there would be no project-generated increase to traffic volumes on roads (or at intersections) in the project area. The intersection levels of service under project conditions would be the same as shown in Table 4.10-2, and the project impact would be less than significant.

Mitigation: None required.

⁴ The referenced operating conditions are currently interim, but are proposed to be made permanent by the Amended Surface Mining and Quarrying Permit project, which is being analyzed in a separate CEQA document.

Impact R4.10-2: The proposed Amended Reclamation Plan would result in post-reclamation development similar to that proposed in the 1982 Amended Reclamation Plan. These future land uses would generate vehicle trips on area roadways (Less than Significant).

Post-reclamation land uses developed after completion of reclamation activities would consist of a mix of housing, commercial uses, community facilities (parks) and a marina. Each of these future land uses would generate vehicle traffic that would use area roadways. Future (year 2025) trip generation associated with post-reclamation land uses were estimated using traffic data published by the Institute of Transportation Engineers (ITE) and the San Diego Association of Governments (SANDAG) and are presented in Table 4.10-3 (ITE, 2004; and SANDAG, 2003). use. Assumptions regarding post-reclamation traffic generation are based on the applicant's post-reclamation development concept for as many as 350 residential dwelling units. This density was used for analysis of post-reclamation development impacts as a worst case assumption, but polices of both the 2007 Marin Countywide Plan Update and the San Rafael General Plan 2020 require a traffic analysis at the time future development is proposed to determine the road capacity and traffic levels from any dwelling unit density greater than the minimum 75 dwelling units identified in the Countywide Plan that might be accommodated at that time. The projected demand does not differ from the demand that would be created by the post-reclamation use previously specified in the ARP82. The issue of traffic generation will be further examined during review of the final Development Plan, which is to be prepared three years prior to the anticipated cessation of Quarry activities.

Additional traffic would also be generated by vehicles traveling to and from a possible ferry landing. Ferry landing trip generation would depend on various factors, such as the size of the landing (including the supply of parking spaces), areas served, transit service to the landing, and the frequency of daily operations, which are unknown at this time. The applicant has not put forth specific plans for development within 100 feet of the shoreline, but anticipates that detailed plans will be included in the final Development Plan, to be submitted three years prior to the cessation of quarrying at the site. Project-level analysis of the detailed plans would examine, among other issues, the extent to which traffic volumes would increase on local roads, and decrease on regional roads.

Because the allowable density of post-reclamation development will be determined by existing roadway capacity at that time, as determined by a County-approved traffic study to be prepared as part of the final Development Plan, no impact on traffic congestion is anticipated.

Mitigation: None required.

**TABLE 4.10-3
 POST-RECLAMATION VEHICLE TRIP GENERATION**

Land Use	Unit	Size	Vehicle Trips		
			Daily	AM Peak	PM Peak
Residential (single-family houses) ^a	DUs	412	3,293	263	296
Commercial (community shopping center)	Acre	42	20,580	617	2,058
Community Facilities (developed park land)	Acre	7	350	14	28
Community Facilities (undeveloped park land)	Acre	3.6	18	1	1
Harbor / Marina	Berth	600	2,400	72	168
		Total	26,641	968	2,552
		Internal Trips ^b	(2,387)	(44)	(236)
		Net New Trips	24,254	924	2,316

^a The density of residential development envisioned as part of the ARP is speculative at this time. According to the Draft Countywide Plan Update, a Specific or Master Plan will be required to determine residential densities, commercial floor area, and habitat protection areas. For the purposes of this EIR, a residential population range was estimated using the Marin Countywide Plan Community Development Element, which proposed single-family residential density ranging from 2 to 4 units per acre. According to this range, and the proposed post-reclamation land uses on the project site, which envision a total of 102.9 acres of residential uses on the site, the Reclamation Plan would develop up to 412 residential units within the Reclamation Plan area.

^b A trip reduction factor was derived on the basis of the interrelationship of land uses of multi-use developments, using information in Chapter 7 of the ITE *Trip Generation Handbook*.

SOURCES: San Diego Association of Governments (SANDAG), *Trip Generation Manual*, May 2003; Institute of Transportation Engineers (ITE), *Trip Generation Handbook*, 2004.

Impacts of the Amended Surface Mining and Quarrying Permit

Potential impacts of the Amended Surface Mining and Quarrying Permit to transportation were examined in the San Rafael Rock Quarry Amended Surface Mining and Quarrying Permit Initial Study and determined to be less than significant.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

Impact C4.10-3: Cumulative transportation impacts would result from additional quarrying activities implemented under the amended Surface Mining and Quarrying Permit, which would be used to achieve increased excavation depths and lateral extents in the Main Quarry Bowl, simultaneous with proposed new reclamation activities. These increased vehicle trips associated with mining equipment and truck trips would increase traffic volumes on area roadways and contribute to deterioration of road surfaces (Less than Significant).

The proposed ARP would result in an increase in depth and lateral extent of excavation of the Main Quarry Bowl. One of the primary effects of this increased excavation would be to prolong the duration of on-site quarrying activities and off-site truck and barge transport of materials as

compared to what would occur under ARP82. This proposed increased duration of mining for a period of approximately 15 to 17 years would result in vehicle trip generation associated with quarry operations, which would not occur under ARP82.

As described in the recent City of San Rafael Environmental Impact Report (EIR) for the proposed Village at Loch Lomond Marina, based on the cumulative planned projects and on *General Plan 2020* build-out (including planned circulation improvements to roads and intersections, and the level-of-service policy amendment to the updated *General Plan 2020*), area intersections would operate acceptably, i.e., within City level of service standards (City of San Rafael, 2006).

In the cumulative context, a project's impact is judged on the basis of how considerable (substantial) its contribution would be to a cumulatively unacceptable condition. Under the amended Surface Mining and Quarrying Permit (AQP), SRRQ proposes to limit truck traffic to conform with the interim operating conditions imposed by the Marin County Superior Court (i.e., the number of truck trips per day, the load capacity, the hours and days of off-site hauling, the frequency of trucks leaving the site during peak traffic periods, and the prohibition of traffic from using North San Pedro Road). As such, there would be no project-generated increase to traffic volumes on roads (or at intersections) in the project area, and the project would have a less-than-significant effect on cumulative traffic and road surface conditions.

Mitigation: None required.

References – Transportation and Traffic

Institute of Transportation Engineers (ITE), *Trip Generation Handbook*, 2004.

San Diego Association of Governments (SANDAG), *Trip Generation Manual*, May 2003.

San Rafael, City of, *The Village at Loch Lomond Marina EIR*, February 2006.

San Rafael, City of, *General Plan 2020*, November 2004.

4.11 Population and Housing

Introduction

This section analyzes population trends in and immediately surrounding the project area, including the Peacock Gap Neighborhood, as well as trends nearby, including the City of San Rafael, and Marin County. This section relies primarily on information from the 2000 U.S. Census (Census), the Association of Bay Area Governments (ABAG), and the Housing Element of the Marin Countywide Plan (adopted in 2003) and the City of San Rafael General Plan. ABAG is a regional planning agency, representing the cities and counties of the Bay Area. The project site is currently used for Quarry operations and is predominantly undeveloped. However, the eventual reclamation and mixed-use development proposed for the site would eventually introduce new residential and commercial uses within the project area, potentially affecting population and housing in the area.

Population Setting

Marin County

In 1990, Marin County was the second least populated county in the nine-county Bay Area,¹ following Napa County, and has remained the second least populated county in the Bay Area through 2005. In 2005, Marin County's population was approximately 251,400. By 2020, ABAG anticipates that Marin County will have a population of approximately 275,000. The Marin Countywide Plan Housing Element build out projections are slightly higher than current ABAG projections, estimating a 2020 population of about 275,400. The analysis in this Environmental Impact Report (EIR) will consider primarily ABAG's 2005 projections since the Housing Element projections relied on ABAG's projections that were calculated in 2000.

Table 4.11-1 summarizes population trends in the Bay Area counties. Marin County's population growth was modest between 1990 and 2005 (an increase of approximately 21,304 people, or 9 percent), and was the lowest of all other Bay Area counties in terms of the percent increase, followed by Napa County, San Mateo and San Francisco counties. Between 2005 and 2020, Marin County's population is expected to increase at a similar rate, approximately 9 percent, but will rank second, behind San Francisco, in terms of the estimated increase in the number of people.

Table 4.11-2 summarizes population trends within Marin County. The unincorporated areas of Marin County have the most population in the County, with an estimated population of 69,100 in 2005. The second most populated area is the City of San Rafael, which in 2005 had a population of 56,200, followed by the City of Novato, which in the same year had a population of 50,900.

¹ The nine counties consist of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

**TABLE 4.11-1
 BAY AREA POPULATION BY COUNTY, 1990-2020**

County	Population						
	1990	2000	2005	% Change 1990-2005	2010	2020	% Change 2005-2020
Alameda	1,276,702	1,443,741	1,517,100	19%	1,584,500	1,714,500	13%
Contra Costa	803,732	948,816	1,016,300	26%	1,055,600	1,150,900	13%
Marin	230,096	247,289	251,400	9%	258,500	275,000	9%
Napa	110,765	124,279	134,100	21%	139,700	148,100	10%
San Francisco	723,959	776,733	798,000	10%	810,700	859,200	8%
San Mateo	649,623	707,163	723,200	11%	741,000	806,500	12%
Santa Clara	1,497,577	1,682,585	1,750,100	17%	1,855,500	2,073,300	18%
Solano	339,471	394,542	423,800	25%	466,100	532,400	26%
Sonoma	388,222	458,614	477,700	23%	508,000	534,100	12%
Bay Area	6,020,147	6,783,762	7,091,700	18%	7,419,600	8,094,000	14%

SOURCE: ABAG (2005)

**TABLE 4.11-2
 MARIN COUNTY POPULATION BY MUNICIPALITY, 1990-2020**

County	Population						
	1990	2000	2005	% Change 1990-2005	2010	2020	% Change 2005-2020
Belvedere	2,147	2,125	2,150	0.1%	2,180	2,220	3.3%
Corte Madera	8,272	9,100	9,400	13.6%	9,700	10,300	9.6%
Fairfax	6,931	7,319	7,300	5.3%	7,400	7,600	4.1%
Larkspur	11,068	12,014	12,000	8.4%	12,500	13,900	15.8%
Mill Valley	13,029	13,600	13,600	4.4%	13,700	14,500	6.6%
Novato	47,585	47,630	50,900	7.0%	53,100	58,800	15.5%
Ross	2,136	2,329	2,350	10.0%	2,420	2,480	5.5%
San Anselmo	11,735	12,378	12,400	5.7%	12,500	12,800	3.2%
San Rafael	48,410	56,063	56,200	16.1%	57,300	61,600	9.6%
Sausalito	7,152	7,330	7,300	2.1%	7,300	7,400	1.4%
Tiburon	7,554	8,666	8,700	15.2%	8,900	9,200	5.7%
Unincorporated	64,077	68,735	69,100	7.8%	71,500	74,200	7.4%
Marin County	6,020,147	247,289	251,400	9.3%	258,500	275,000	9.4%

SOURCE: ABAG (2000, 2005)

San Rafael is also Marin County's fastest growing city; the population there increased by approximately 16 percent from 48,410 in 1990 to an estimated 56,200 persons in 2005 (ABAG, 2002 and 2005).

City of San Rafael and the Peacock Gap Neighborhood

The Peacock Gap Neighborhood consists primarily of single family homes, townhouses, and a golf course, and is located immediately across Point San Pedro Road from the project site. The Peacock Gap Neighborhood is partially within the City of San Rafael's city boundary (which extends to Point San Pedro Road), and partially within Unincorporated Marin County (portion south of Point San Pedro Road).

The existing residential uses within this Neighborhood are located primarily within Block Group 1 of Census Tract 1102. Based on Census 2000 data, the population associated with the residential uses on Block Group 1 is 2,403 and the number of housing units is 1,007.

Population Characteristics

According to Census 2000 data, the median age² in Marin County was 41.3 years of age, which is considerably higher than the state of California's median age (33.3 years of age). The majority of Marin County residents (approximately 66.2 percent of the population) are over the age of 18 and under the age of 65. According to the Census 2000, approximately 33,432 seniors (65 years of age and older), or about 13.5 percent of the population live in Marin County. The percentage of seniors in Marin County is slightly higher than the percentage of seniors within the state (about 11 percent of the state population). The number of youth under the age of 18 in 2000 was approximately 50,185, or 20.3 percent of the population in Marin County, slightly more than the percentage of youth under the age of 18 in the state (about 17 percent of the state population).

In the City of San Rafael, the median age was 38.5. Approximately 37,071 persons, or 66.1 percent of the population, are over the age of 18 and under the age of 65; 8,055 persons, or 14.4 percent of the population are seniors; and 10,937 persons, or 19.5 percent of the population are under the age of 18.

Employment

The total number of jobs in Marin County, held by both County residents and non-residents, was estimated to be 135,610 in 2005. By 2020, the County is projected to include approximately 156,060 jobs, representing an increase of about 15 percent between 2005 and 2020. There were approximately 46,260 jobs in the City of San Rafael in 2005, and it was ranked first in Marin County for total jobs. According to *ABAG Projections 2005*, the number of jobs in the City of San Rafael and its Sphere of Influence (SOI) is forecast to increase by approximately 13 percent between 2005 and 2020 to a total of 52,330 jobs (ABAG, 2005). Table 4.11-3 summarizes employment trends within San Rafael and its and vicinity.

² One-half of the population is older than the median age, and one-half of the population is younger than the median age.

**TABLE 4.11-3
 SAN RAFAEL AND SOI (INCLUDING PEACOCK GAP), AND VICINITY
 EMPLOYMENT CHANGE, 2000–2020**

Municipality	Jobs					% Change 2005-2020
	2000	2005	% Change 2000-2005	2010	2020	
Corte Madera	6,780	6,850	1.0%	6,940	7,400	6.6%
Larkspur	7,410	7,570	2.2%	7,640	8,650	13.2%
San Rafael	45,140	46,260	2.5%	48,710	52,330	7.4%
Unincorporated	23,380	23,340	-0.2%	24,650	26,330	6.8%
Marin County	134,180	135,610	1.1%	141,770	156,060	10.1%

SOURCE: ABAG (2005)

Housing Setting

This section summarizes existing housing conditions, housing costs, and the County’s fair share of the regional housing needs as determined by ABAG.

Marin County

Between 1990 and 2005, the number of housing units increased throughout the Bay Area by approximately 13 percent. During this period, Marin County experienced an approximate 8 percent growth in the housing stock, adding about 7,725 units. In terms of the percentage increase, Marin was among the counties that experienced the lowest growth in the housing stock (other counties with low growth included San Mateo and San Francisco). Table 4.11-4 compares the number of housing units from 1990 to 2005 in each of the nine Bay Area Counties.

**TABLE 4.11-4
 NUMBER OF HOUSING UNITS BY COUNTY FOR THE BAY AREA 1990-2005**

County	1990 Housing Units	2000 Housing Units	2005 Housing Units	% Change in Housing Units 1990–2005
Alameda	504,109	540,183	558,840	11%
Contra Costa	316,170	354,577	378,343	20%
Marin	99,757	104,990	107,482	8%
Napa	44,199	48,554	52,209	18%
San Francisco	328,471	346,527	355,903	8%
San Mateo	251,782	260,576	266,842	6%
Santa Clara	540,240	579,329	607,035	12%
Solano	119,533	134,513	146,251	22%
Sonoma	161,062	183,153	191,949	19%
Bay Area	2,365,323	2,552,402	2,664,854	13%

SOURCES: U.S. Census Bureau (2000); State of California (2005)

City of San Rafael and the Peacock Gap Neighborhood

ABAG estimates that the City of San Rafael had about 22,700 households as of 2005, and is projected to increase by about 7.5 percent (an increase of about 1,700 households) by 2020. Table 4.11-5 compares the existing and projected number of households in San Rafael as well as unincorporated Marin and other nearby municipalities between 2000 and 2020.

**TABLE 4.11-5
SAN RAFAEL AND SOI (INCLUDING PEACOCK GAP), AND VICINITY
HOUSEHOLDS 2000-2020**

Municipality	Households					
	2000	2005	% Change 2000-2005	2010	2020	% Change 2005-2020
Corte Madera	3,776	3,930	4.1%	4,020	4,220	7.4%
Larkspur	6,142	6,160	0.3%	6,350	7,020	14.0%
San Rafael	22,371	22,700	1.5%	23,000	24,400	7.5%
Unincorporated	25,434	25,900	1.8%	26,740	27,690	6.9%
Marin County	100,650	103,250	2.6%	105,560	111,290	7.8%

SOURCE: ABAG (2005)

Household Size

According to the 2000 Census, the average household size in San Rafael and its SOI in 2000 was 2.41 persons per household, which was slightly higher than the Marin County's average of 2.34. ABAG projects that within the City/SOI of San Rafael, the average household size will increase slightly to about 2.45 by 2020. The average household size within the County is also expected to increase slightly, to 2.36 persons per household by 2020 (ABAG, 2005).

Household Income

ABAG estimates for Marin County indicated that the mean, or average, household income in 2005 was approximately \$113,700. Similarly estimates for the City of San Rafael mean household income in 2005 was approximately \$92,600³ (ABAG, 2005).

Jobs/Housing Balance

The concept of a jobs/housing balance is used to examine whether a region has a balance between its housing supply and its employment base. The primary function of such an analysis is to provide a generalized measure of employment or housing need in areas where the relationship between these two characteristics is out of balance and to indicate the potential severity of such a condition on traffic and related effects to air quality, and housing affordability. A region with too many jobs relative to housing is likely to experience escalation in housing prices (with a

³ In constant 2000 dollars.

concurrent decline in affordability for the lower-income segments of the community) and intensified pressure for additional residential development. Conversely, a region that has relatively few jobs in comparison to employed residents may have many workers commuting to jobs elsewhere which can lead to increased traffic congestion and adverse effects on both local and regional air quality.

According to ABAG, San Rafael and its SOI have substantially more jobs than employed residents, indicating that residents from other areas commute to the San Rafael area to work. The jobs/employed residents ratio within San Rafael and its SOI in 2005 was 1.51 (48,490 jobs for 32,330 employed residents). ABAG projects that the jobs/employed residents ratio will decrease to 1.32, based on 55,130 jobs and 41,960 employed residents by 2020, although the trend of residents commuting outside of the area for employment will continue.

The jobs/employed residents ratio in Marin County is also weighted slightly towards jobs, although not as heavily as San Rafael and its SOI. In 2005, according to ABAG, the jobs/employed residents ratio is about 1.11 (135,610 jobs and 122,200 employed residents), and this ratio is expected to decrease to 1.0 (156,060 jobs and 156,690 employed residents) by 2020, indicating that a jobs-housing balance will be reached.

Table 4.11-6 compares the existing and projected jobs-to-employed-residents ratios in San Rafael as well as Marin County and the Bay Area as a whole.

**TABLE 4.11-6
 BAY AREA, MARIN COUNTY AND SAN RAFAEL (AND SOI) JOBS TO
 EMPLOYED RESIDENTS RATIOS (2005, 2020)**

	Bay Area		Marin County		City of San Rafael (and SOI)	
	2005	2020	2005	2020	2005	2020
Jobs	3,516,960	4,463,630	135,610	156,060	48,790	55,130
Employed Residents	3,225,100	4,092,620	122,200	156,690	32,330	41,680
Jobs/Employed Residents Ratio	1.09	1.09	1.11	1.0	1.51	1.32

SOURCE: ABAG (2005)

Regulatory Framework

State

Government Code Section 65588

California requires every city and county in the state to include a housing element in its General Plan. Housing elements are prepared approximately every five years, following timetables set forth in the law. According to state law, San Francisco Bay Area jurisdictions, including Marin County, are mandated to complete and adopt a housing element covering the period from

January 1, 1999, through June 30, 2006 (ABAG, 2001). The housing element must address housing opportunities for low- and moderate-income residents on a local and regional level.

Each local government shall review its housing element as frequently as appropriate to evaluate all of the following:

- (1) The appropriateness of the housing goals, objectives, and policies in contributing to the attainment of the state housing goal.
- (2) The effectiveness of the housing element in attainment of the community's housing goals and objectives.
- (3) The progress of the city, county, or city and county in implementation of the housing element.

[Government Code Section 65588(a)-(b)]

State law also requires an analysis of the needs of special housing groups, including the homeless, and requires each city and county to identify sites suitable for emergency shelters and transitional housing.

Local

Marin Countywide General Plan – Housing Element

The Marin Countywide General Plan Housing Element was updated and adopted on June 3, 2003. The Housing Element establishes comprehensive, long-term objectives and implementing policies for the housing within the county. Those guiding and implementing policies contained in the Housing Element pertinent to the proposed project are discussed below. Please see Section 4.6, Land Use and Planning, for other policies in the Countywide Plan and the draft Countywide Plan Update applicable to the proposed project.

Policy H-1.1 Local Government Leadership. Affordable housing is an important County priority, and the County will take a proactive leadership role in working with community groups, other jurisdictions and other agencies in following through on identified housing element implementation actions in a timely manner.

Policy H-3.1 Housing for Local Workers. County will strive to provide an adequate supply and variety of housing opportunities to meet the needs of Marin County's workforce and their families, striving to match housing types and affordability, with household income.

Policy H-3.2 Contributions for Workforce Housing from Non-Residential Uses. Local housing needs for local workers is an important factor for the County when reviewing non-residential development proposals. The County will require specific non-residential uses to contribute to the provision of affordable workforce housing, such as the provision of housing on-site, or other alternatives of equal value.

Policy H-3.6 Variety of Housing Choices. In response to the broad range of housing needs in Marin County, the County will strive to achieve a mix of housing types, densities, affordability levels and designs. The County will work with developers of 'non-traditional' and innovative housing approaches in financing, design, construction and types of housing that meets local housing needs, including, but not limited to, provision

of the following types of housing at varying affordability levels: a. Owner and renter housing; b. Small and large units; c. Single and multifamily housing; d. Housing close to jobs and transit; e. Mixed use housing; f. Supportive living; g. Single Room Occupancy units (SRO's); h. Shared living opportunities; i. Co-housing; j. Manufactured housing; k. Self-help or "sweat equity" housing; l. Cooperatives or joint ventures between owners, developers, and nonprofit groups in the provision of affordable housing; m. Eco-housing; n. Assisted living; and, o. Supportive housing.

Policy H-3.19 Inclusionary Housing Approach. To increase affordable housing construction, the County will require residential developments involving one or more units to provide a percentage of units or an "in-lieu" fee for very low, low and moderate income housing. The units provided through this policy are intended for permanent occupancy and must be deed restricted, including but not limited to single family housing, multi-family housing, condominiums, townhouses, locally approved licensed care facilities, stock cooperatives or land subdivisions.

Policy H-3.20 Income Levels. Inclusionary zoning requirements will target very low or low income rental units and low or moderate income ownership units. 30-80 percent Area Median Income (AMI) for rental units and 50 –120 percent AMI for ownership units.

City of San Rafael General Plan

The City of San Rafael General Plan Housing Element establishes comprehensive, long-term objectives and implementing policies for the housing within the city. Those guiding and implementing policies contained in the Housing Element pertinent to the eventual development envisioned for the project site are discussed below. Please see Section 4.6, Land Use and Planning, for other policies in the San Rafael General Plan applicable to the proposed project.

Housing Element

Goal 3: It is the goal of San Rafael to have a strong sense of community and responsibility in meeting housing needs.

Policy H-1: Housing Distribution. Promote the distribution of new and affordable housing of quality construction throughout the city to meet local housing needs.

Policy H-6: Coordinate with Other Jurisdictions in Addressing Housing Needs. Collaborate when possible with other jurisdictions in Marin County in addressing regional housing needs.

Policy H-9: Funding for Affordable Housing. Seek proactive and creative ways to lower housing costs for lower income households and people living with special needs. Continue to use local, state and federal assistance to achieve housing goals and to increase ongoing local resources to provide for affordable housing.

Policy H-1: Special Needs. Encourage a mix of housing unit types throughout San Rafael, including very low- and low-income housing for families with children, single parents, students, young families, lower income seniors, homeless and the disabled. Accessible units shall be provided in projects, consistent with State and Federal Law.

Policy H-14: Innovative Housing Approaches. Encourage innovative housing approaches in financing and design of units to increase the availability of low- and moderate-income housing and especially for housing that meets the City's housing needs.

Policy H-19: Inclusionary Housing Requirements. Require residential projects to provide a percentage of units for below market rate (BMR) housing ... Provide units affordable at below market rates for the longest feasible time, or at least 55 years. The City's primary intent is the construction of units on-site. The units should be of a similar mix and type to

that of the development as a whole, and dispersed throughout the development. If this is not practical, the City will consider other alternatives of equal value, such as in-lieu fees, construction of units off-site, donation of a portion of the property for future non-profit housing development, etc. Allow for flexibility in providing affordable units as long as the intent of this policy is met.

Policy H-23: Mixed Use. Encourage development of residential uses in commercial areas where the vitality of the area will not be adversely affected and the site or area will be enhanced by linking workers to jobs, and by providing shared use of the site or area.

Policy H-24: Contributions Towards Employee Housing. Require new nonresidential development to contribute towards affordable housing created by such development, such as provision of housing on- or off-site, or other alternatives of equal value.

Neighborhoods Element

Policy NH-143. San Rafael Rock Quarry and McNear's Brickworks... If operations cease during the timeframe of this plan, consider annexation and allow redevelopment of the San Rafael Rock Quarry and McNear's Brickyard.

ABAG's "Fair Share Allocation"

Housing allocation income groups for Marin County, which includes the City of San Rafael, are defined by ABAG as follows:

- Very Low income is defined as less than 50 percent of the median income;
- Low Income is defined as 50–80 percent of the median income;
- Moderate Income is defined as 80–120 percent of the median income;
- Above Moderate is defined as greater than 120 percent of the median income.

State law establishes that regional councils of government shall identify for each city and county a "fair share allocation" for the provision of housing at all income levels within its jurisdiction. The regional housing needs determination for the City of San Rafael, which includes the existing residential uses of the Peacock Gap Neighborhood, are presented in Table 4.5-7. The Housing Element of the San Rafael General Plan utilizes the Regional Housing Needs Determination completed by ABAG in November 2000 to identify the housing needs within the city. Housing needs are assessed for the period between January 1, 1999 and June 30, 2007.⁴

The total regional housing needs allocation for San Rafael and its SOI is 2,090 housing units. ABAG projects that out of these housing units, 445 units would be in the very-low income category, 207 in the low category, 562 in the moderate category and 876 in the above moderate category. Since 1999, 638 housing units have been constructed or approved within San Rafael and its SOI. Table 4.11-7 identifies the projected levels of housing needs for San Rafael and its SOI according to ABAG's Regional Housing Needs Assessment, and also identifies housing units, by income category, constructed between 1999 and 2003.

⁴ The California Legislature passed SB 491, revising the regional needs/Housing Element planning period from June 30, 2006 to June 30, 2007.

**TABLE 4.11-7
 SAN RAFAEL PROJECTED HOUSING NEEDS**

	Affordability Level				Total
	Very Low	Low	Moderate	Above Moderate	
Projected Number of Needed Units 1999-2006	445	207	562	876	2,090
Units Built or Approved (1999 - Dec 2002)	27	34	285	285	638
Units Under Review (as of 2003)	0	34	24	463	524
Net Housing Needs	418	130	252	128	928

SOURCE: ABAG (2001), City of San Rafael (2003)

Impacts and Mitigation Measures

Significance Criteria

Consistent with California Environmental Quality Act Guidelines (CEQA *Guidelines*) Appendix G, the Project would result in a significant impact to population and housing if it would:

- Induce substantial growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Impacts of the Amended Reclamation Plan

Impact R4.11-1: Post-reclamation residential development would result in an increase in the residential population within the area (Less than Significant).

The 2004 Amended Reclamation Plan (ARP04) specifies a mix of residential, commercial, and marina development for the Quarry site following reclamation, similar to that specified in the 1982 Amended Reclamation Plan (ARP82). However, the density of residential development envisioned as part of the Amended Reclamation Plan is speculative at this time. According to the Draft Countywide Plan Update, Policy PA 3.2 (Designate Land Use in Point San Pedro), "...a Specific or Master Plan will be required to determine residential densities, commercial floor area, and habitat protection areas. No changes in density of land use intensities are proposed prior to approval of a Specific or Master Plan." Nevertheless, for the purposes of this EIR, a residential

population range was estimated using the Marin Countywide Plan Community Development Element, which proposed single-family residential density ranging from two to four units per acre (Policy CD-11.2. Point San Pedro). According to this range, and the proposed post-reclamation land uses on the project site, which envision a total of 102.9 acres of residential uses on the site, the Reclamation Plan would develop between approximately 206 and 412 residential units within the Reclamation Plan area. Using ABAG's population projection of 2.36 people per single family unit (projected for year 2020), the proposed project has the potential to introduce approximately 485 to 970 residents to the site. Currently, only three residential units exist on the project site, so the residential population introduced to the site post-reclamation would be almost entirely new.

According to the ABAG's population projection for Marin County, the County's population in 2020 is anticipated to be approximately 275,000; thus, the proposed residential component of the post-reclamation development would represent an increase in the range of 0.17 to 0.35 percent of the County's projected population (ABAG). With respect to the resident population, the change would represent less than one percent of citywide estimates for the City of San Rafael; therefore, it is not expected that the post-reclamation development of the site would induce substantial population growth in the area.

Regarding compliance with affordable housing requirements, this component of post-reclamation Plan use would be considered in greater detail at the time of specific master planning for the site, which, as mentioned above, would be required prior to the site's development. It is assumed at this time that the development of the site would include the necessary Below Market Rate homes to satisfy the City Housing Allocation Plan requirements for providing affordable housing, or the project sponsor would pay in-lieu fees that would contribute to the development of affordable housing in other parts of the city or county.

The post-reclamation development of the project site is considered in the Peacock Gap Neighborhood Plan, and is therefore considered in population projections for the County. Any residential or commercial development on the site may require extension of the utilities infrastructure and roadways to the project vicinity that would serve the newly developed areas. These types of infrastructure improvements associated with the proposed project would consist of local connections to the project site and would be coordinated and financed by the project sponsor(s). Although the project site is currently engaged in Quarry activities, because mixed-use development is envisioned for the site in the long-run, the proposed project would not indirectly induce substantial population growth.

Based on the foregoing, the proposed project would not induce substantial population growth in the project site vicinity, either directly or indirectly, and the impact would be less than significant.

Mitigation: None required.

Impact R4.11-2: The project could result in an increase in employment within the Amended Reclamation Plan Area (Less than Significant).

ARP04 envisions commercial uses at the project site, which would generate daytime population on site attributable to office and commercial uses. There is little substantive change from ARP82. Specifically, a total of 42 acres would be allocated to commercial and mixed-use areas as envisioned in ARP04. According to the San Rafael General Plan Land Use Element Policy LU-9 (Intensity of Nonresidential Development), “intensity of commercial and industrial development on any site shall respond to the following factors: site resources and constraints, traffic and access, potentially hazardous conditions, adequacy of infrastructure, and City design policies.” Therefore, it is essential to note that, like residential population, the number of employees associated with commercial uses after reclamation is speculative at this time. However, an estimate could be derived using the Floor Area Ratio (FAR) of 0.02 designated for most areas of the SRRQ site by the Land Use Element of the San Rafael General Plan. Using this FAR, and assuming full buildout of the site, approximately 36,590 square feet of office and commercial space would be permitted on site. Using an estimate of approximately 200 feet per employee, the Reclamation Plan would introduce a daytime population of approximately 180 to the site. This would represent a less than one percent increase in San Rafael’s or Marin County’s projected employment total, and would be considered a less than significant impact.

Mitigation: None required.

References – Population and Housing

Association of Bay Area Governments (ABAG), *Projections 2005*, December 2004.

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City of San Rafael, *San Rafael General Plan 2020: Housing Element*, November 15, 2004.

State of California, Department of Finance, *E-5 City / County Population and Housing Estimates, 2005*, Revised 2001-2004, with 2000 DRU Benchmark, Sacramento, California, May 2005.

U.S. Census Bureau, *American Fact Finder*, <http://factfinder.census.gov/servlet/BasicFactsServlet>, accessed September, 2006.

4.12 Cultural Resources

This section provides background setting information for cultural resources, including archaeological and historic architectural resources. This section also includes a description of the known cultural resources in the project area and on the project site, as well as a summary of the project area's cultural history, and the regulatory environment governing protection of cultural resources. Resources for this section include archival research conducted at the California Historical Resources Information System's Northwest Information Center (NWIC), local historical depositories, and cultural resources inventories and evaluations of the San Rafael Rock Quarry site by Environmental Science Associates (ESA) cultural resources staff in July and August, 2006.

Setting

Archaeological Resources

Prehistoric Setting

The natural marshland biotic communities along the edges of bays and channels were the principal source for subsistence and other activities from the middle Holocene¹ until the contact period in the San Francisco Bay region. Efforts to reconstruct prehistoric times into broad cultural stages (e.g., Early Period, Middle Period) allows researchers to describe a wide number of sites with similar cultural patterns and components during a given period of time, thereby creating a regional chronology.

Many of the original surveys of archaeological sites in the Bay region were conducted between 1906 and 1908 by N.C. Nelson and yielded the initial documentation of nearly 425 "earth mounds and shell heaps" along the littoral zone of the Bay (Nelson, 1909). From these beginnings, the most notable sites in the Bay region were excavated, such as the Emeryville shellmound (Ala-309), the Ellis Landing Site (CCo-295) in Richmond, and the Fernandez Site (CCo-259) in Rodeo Valley (Moratto, 1984). These dense midden sites are vast accumulations of domestic debris, which have been carbon 14 dated to be 2,310 ±220 years old, but other evidence from around the Bay suggests that human occupation in the region is of greater antiquity, or ±5000 B.C. (Jones, 1992). While many interpretations exist as to the function of the shellmounds, much of the evidence suggests that they served as sociopolitical landmarks on the cultural landscape and perhaps as ceremonial features as well.

For the San Francisco Bay Area, the Early to Middle Period, or the so-called "Berkeley Pattern," is characterized by almost exclusive use of cobble mortars and pestles, which is often associated with a heavy reliance on acorns in the economy (Moratto, 1984). This unusually intensive reliance on one foodstuff indicates that a shift away from the earlier reliance on a broad spectrum of dietary sources to supply demand was needed around 1,000 years ago. The Late

¹ A geologic epoch representing the last 10,000 years.

Pleistocene/Early Holocene profusion of food availability along lakeshores and estuaries likely led to an overexploitation of the resources, which initially resulted in population increases but may also have forced inhabitants to rely on a readily available yet lower ranked resource like acorns or seeds (Jones, 1991). Nevertheless, given the burgeoning size of Early to Middle Period settlements, it is probable that the populations were denser and more sedentary, yet continued to exploit a diverse resource base—from woodland, grassland, and marshland to Bayshore resources throughout the San Francisco Bay area (King, 1974). Many of the Berkeley traits diffused throughout the region and spread to the interior areas of central California during this time period.

The population increases and larger, more complex settlements that began in the late-Early Period typify the Middle Period (circa 500 BC–AD 1000) (Arnold et al., 2004). The sociopolitical landscape also appears to become more elaborate, with clear differentiations in wealth and evidence of personal aggrandizement. During the Late Period (circa AD 1000–1700), however, new sites start to decline in the record and the large shellmounds were abandoned. The Late Period also showed population declines and associated changes in resource use—likely due to human-caused depletions in some terrestrial food sources during the Middle Period (Broughton, 1994).

The State of California has officially recorded 630 archaeological sites in Marin County. These deposits have received the traditional “trinomial” designation. There are also potentially an unknown number of unrecorded sites. (Marin County Community Development Agency, 2003)

The distribution of known archaeological sites in Marin County is skewed toward the urban areas and the Point Reyes Peninsula. Throughout the historic period the more urbanized eastern part of the County was the center of activities, and this has been a concentrating force on the locations chosen for examination by archaeologists. The earliest attempts to map the archaeological sites of the county systematically occurred after the turn of the twentieth century, primarily by N.C. Nelson in 1907, as described above. These early mapping efforts were concentrated along the shoreline of San Francisco Bay.

Paleontologic Resources

Paleontologic resources are fossilized evidence of past life found in the geologic record. Despite the prodigious volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils (particularly vertebrate fossils) are considered to be nonrenewable resources. Because of their rarity and the scientific information they can provide, fossils are highly significant records of ancient life. Paleontologic resource localities are sites where the fossilized remains of extinct animals and/or plants have been preserved.

Sedimentary rock formations that yield significant vertebrate or invertebrate fossil remains are considered to possess paleontological sensitivity. Significant paleontological resources can be found anywhere within the geographic extent of sedimentary rocks formations in the project area.

Historic Resources

History of Marin County and the Project Site

Marin County

The first Euroamerican to sail into the area was Sir Francis Drake, who sailed his ship, the *Golden Hinde*, near the shore of what is now called Drake's Bay. The first permanent Spanish settlement in Marin was not established until 1817 when Mission San Rafael Archangel was founded partly in response to the Russian built Fort Ross in what is now Sonoma County. It was the 20th mission in California's 21-mission chain. Chief Marin, who was named by the Spaniards, led a band of resisters against the Spaniards, and was formidable enough that the County was named in his honor (Marin County Community Development Agency, 2003).

In 1821 control of California passed from Spain to Mexico, and in the early 1830s secularization of mission properties occurred. During the next decade, Marin was divided into separate ranchos. A grantee was required to become a Mexican citizen and baptized Catholic; thereafter his first name was Spanish and he was known as a "don." Juan Reed, Sausalito's first known English-speaking resident, was granted the Rancho Corte Madera del Presidio. Adjacent land was granted to Captain Guillermo Antonio Richardson, an Englishman and the first port captain of San Francisco. Timoteo Murphy was given an immense grant that included San Rafael, where he managed the mission properties. Much of today's southern Marin County, including Pt. San Pedro, was in the Rancho San Pedro Margarita y las Gallinas land grant. The United States' occupation of California began in 1846, and California became a state in 1850, with Marin as one of its original counties. As settlement accelerated, the huge cattle-raising ranchos gradually gave way to smaller ranches, many of which still flourish today (Marin County Community Development Agency, 2003).

One of the earliest, largest, and most productive Chinese fishing villages in California, China Camp, was in operation by 1870 near Point San Pedro. The Chinese immigrants and their descendants introduced the use of commercial netting to catch bay shrimp off Point San Pedro. In its heyday during the 1880s, nearly 500 people, originally from Canton, China, lived in the village, which had three general stores, a marine supply store, and a barber shop. Over 90 percent of the shrimp the fishermen netted were dried and shipped to China or Chinese communities throughout the U.S. China Camp, listed on the National Register of Historic Places, represents the last surviving Chinese shrimp fishing village in California. The Chinese also discovered that the clay soils in the region were ideal for brick making, which marked the beginning of the area's most prominent industries (California State Parks, 2006).

By the 1880s and 90s, trains, steamships and ferries were introduced to the County, and ferry slips were built at Sausalito and Tiburon. Transportation meant Marin County farmers could supply San Francisco with food. It also meant more people could access Marin County, which quickly became a suburb of San Francisco. When the Golden Gate Bridge was completed connecting San Francisco with Marin County, development pressure in Marin increased. During World War II people came from all across the country to work in the Sausalito shipyards and at

Hamilton Air Force Base in Novato. Between 1970 and 1999, the population of Marin County increased from 123,000 residents to about 245,000 (Marin County Community Development Agency, 2003).

The City of San Rafael developed around Mission San Rafael Archangel, located at 1104 Fifth Avenue in today's downtown San Rafael. San Rafael was incorporated in 1874 and became a charter city in 1913. San Rafael is now the County seat for Marin County (City of San Rafael, 2006).

History of the Project Site

Development of the project site as a quarry and brickworks begins with John A. McNear, who came to California from Maine in 1856, settling first in Petaluma. On Sep 2, 1869, John McNear, with the help of his brother George Washington McNear, paid \$35,000 for 745 acres of dry land and 287 acres of marsh and tide land along the shoreline at Point San Pedro, then part of the Rancho San Pedro Santa Margarita y las Gallinas Land Grant (McNear, 2006). John Augustus McNear envisioned the Point as a major shipping port and industrial center for the San Rafael area with water and rail links to the rest of the Bay Area. By 1865, steamers were running between Petaluma, McNear's Point and San Francisco.

John McNear became the first manufacturer of concrete in the area in 1864, and was credited as the first to use reinforced concrete in the construction of a reservoir on his Point San Pedro land in 1870 (Chavez, 1979). Between 1871 and 1878, McNear bought additional acreage at Point San Pedro. These additional purchases of land encompassed the former Fortin Brick Works, and McNear began a brick manufacturing industry which continues to this day (McNear, 2006) (also see history of McNear's Brickyard, below).

In the 1880s, John McNear and his eldest son, George P. McNear, built summer homes on what is known as McNear's Beach County Park (immediately north of the project site). The area developed into a fashionable resort community called 'The Glen,' complete with a hotel, tennis courts, dance hall and rose garden. It also served as a stop over point for the steamer 'Gold' (Chavez, 1979).

By the turn of the twentieth century, McNear and son Erskine had constructed sheds and houses, installed a brick Hoffman-type kiln (see definition below), and were selling bricks throughout the Bay Area. The brickyard rapidly grew into a small company town, complete with a post office and the region's first school (Chavez, 1979).

This vision of the Point and City as an industrial center, as well as most of John Augustus McNear's fortune and financial backing, was destroyed by the fires which followed the 1906 San Francisco earthquake. His vision of connecting his land with San Rafael by railroad was also destroyed when the financial backers who had promised to support him withdrew their funds to help rebuild San Francisco (Chavez, 1979).

Despite this set back, McNear moved forward with his industrial plans for the Point. Point San Pedro was, and is currently, a rich source of raw building material needed for the Bay Area's construction and development trades. The rock of San Pedro Hill located directly adjacent to the Bay made quarry stone materials a highly profitable commodity. The mineral resources of Marin County are described as follows in a California State Mining Bureau report from 1915:

“The mineral resources of Marin County, while limited numerically, are none the less important individually. They are mainly structural and industrial materials. In the order of their production to date, they are: brick, stone industry, mineral water, granite, salt, and copper. Their total recorded output is \$3,869,799 to the end of 1913.” (California State Mining Bureau, 1915)

Point San Pedro had three active quarries in the late nineteenth and early twentieth centuries which were owned and operated by John Augustus McNear and his family at various points in time, and were referred to collectively as the “McNear Quarries at San Pedro Point.” At its zenith, the McNear family owned approximately 2,500 acres of land on Point San Pedro, including the brickyard, the quarries, and a substantial dairy operation (Chavez, 1979). The history of the Quarry, the McNear Brickyard, the McNear Dairy, and the former U.S. Army Signal Corp structures is provided below.

Jordan Quarry. Jordan Quarry, located at the current Quarry site, was originally opened by Dennis Jordan in 1876. The Quarry operations were taken over by McNear's San Francisco Company in 1904. Large pieces, called ‘Sling’ rock, of blue-grey metamorphic sandstone with occasional small seams of limestone and quartz was the typical rock quarried. By 1915, 3,000,000 tons had been removed and the Quarry face was 200 feet high and 500 feet long. Steam operated machine drills were used, as were four steam-driven derricks. The crushing plant had a capacity of 700 tons per day, and used electric power. Three hundred tons of rubble per day could be handled, with a total daily capacity of 1,000 tons at the Quarry, which employed about 100 men around 1915. Crushed rock was delivered to San Francisco at \$1.20 per cubic yard, or sold at the Quarry pier for under \$1. The company also had six barges with capacities of 400 to 600 tons each, each carrying a crew of five (California State Mining Bureau, 1915). The Daniel Contracting Company took over the San Francisco Company operations at the former Jordan Quarry sometime after World War I.

Bull Quarry. Bull Quarry, located at the current Quarry site, was originally opened by Bull and Gossard in 1904. By 1914 the Quarry had changed ownership and for several years was operated by Wetmore Brothers. After 1914 operation of Quarry changed hands again, this time to the Daniel Contracting Company. Contracts for the Quarry rock supplied 600,000 tons of rubble to “Key Route,” in Emeryville and 400,000 tons to the San Francisco sea wall.² At this time the Quarry face was approximately 200 feet high and 1,200 feet in width and ships transported 2,500 tons of rubble per day. The typical operations for removal of the rock started with a thin ‘skin’ of soil over the rock which was removed with hydraulics. The rock was then tunneled 25 feet and

² This seawall formed the northern edge of the fairgrounds for the 1915 Pan Pacific International Exposition, and is now the Marina Green Seawall in San Francisco's Marina District.

blasted with 5-10 tons of dynamite. This yielded pieces of Franciscan Metamorphic Sandstone, parts of which were yellowish brown from oxidation, and up to three to four feet in width. Limits of the Quarry were defined by small amounts of clay and shale in the north. The material was loaded by steam shovels into side-tipping dump cars which were pulled onto the loading pier by a small steam locomotive, and then shipped around the Bay by the company's 12 skip barges. By 1914, the Bull Quarry employed about 75 to 90 men, and had a crushing and screening plant with a capacity of 250 cubic yards per day (California State Mining Bureau, 1915).

Marin Quarry. Marin Quarry, also located at the current Quarry site, was a little-worked quarry to the southwest of the Jordan Quarry, between the Jordon Quarry and McNear's Brickyard. Operation began in 1905 by the Gray Brothers and later operations were transferred to the Western Development Syndicate. In 1914, after sitting idle for many years, the Quarry was leased to the San Francisco Company (Sparks, 2004).

By 1955 only two quarries were still in operation, the more southwesterly Jordan Quarry and the more northeasterly Bull Quarry, and operations were under the management of the Basalt Rock Company. At this time most of San Pedro Hill revealed a 200 foot high Quarry face (California Journal of Mines and Mineral Resources, 1955).

In 1971 the McNear family sold the quarries as well as the rest of the land they still held on the Point to a Honolulu-based development corporation, the Dillingham Corporation. The Basalt Rock Company, a subsidiary of the Dillingham Corp., continued operations of the Quarry. In 1986, the Dutra Company acquired the Quarry, which operates the facility today. Dutra has been in operation for over 100 years, starting with clamshell dredging in the Delta. Aside from its quarrying operation, the company is also involved in marine construction, bridge repair, levee maintenance, dredging, and other shoreline engineering projects. The original quarries have since been subsumed within today's existing Quarry site, and no longer exist as distinct units.

McNear's Brickyard (on-site). John A McNear purchased the Fortin Brick Works in the early 1870s, located on the western side of the hill opposite the Quarry on Point San Pedro, and began his own brick manufacturing company which continues to this day. The brickyard was renamed the McNear Company, and in 1902, the office, a boarding house, a cookhouse, and the first of two Hoffman³ kilns were constructed. A second Hoffman kiln was built in 1904, as was a wooden bunker, used for crushing and screening the clay shale as part of the brickmaking process (McNear, 2006). By the time of the 1906 earthquake, the factory was shipping 80,000 bricks per day (Sparks, 2004).

³ A Hoffman kiln is a brick-lined tunnel with an elliptical shape, with doorways placed on the outside walls of the tunnel. The exhaust flues located on the inside walls of the tunnel are connected to the brick smokestack above. 'Green' or unfired brick would be stacked inside the tunnels by the workers where they would be fired for about two weeks in a continuous process of brick placement and removal. The Hoffman kiln at McNear's Brickyard would burn about three tons of coal a day, and often the same fire would burn for several years. The fire advanced about six rows of firing holes each day, and since there were 88 rows, it took about two weeks to make a complete circuit. The fire's progress was controlled by adding coal to the front of the fire, opening dampers over flues to the smokestack in front, and closing them behind. As the brick fired, they shrank or settled about 3 1/2 inches. The kiln held about a half million bricks and 150,000 were set and wheeled in every week (McNear, 2006).

The raw material for making bricks was in abundance at the west side of San Pedro Hill, just to the west of the Quarry. The strike of shale which fueled the brick business could be easily mined and hauled a short distance to the factory, and then sent by schooner to anywhere in the area (Sparks, 2004).

Initially, clay was mined on the site by pick and shovel, and moved around the yard by horse cart. Bricks were molded by hand in wooden mold boxes, and after drying in the sun, they were fired in open-air field kilns fueled with wood (prior to the construction of the Hoffman kilns described above). Bricks were moved around the yard by wheelbarrow. In the early twentieth century, clay mining changed from pick and shovel work to a steam shovel and a dragline, and the material was hauled from the Main Quarry Bowl to the rock crusher in gondola cars on an electric train. Also in the early twentieth century, brick making changed from mold boxes to an extrusion process, using a Ferris wheel brick cutter. After the bricks were cut, they were put into dry sheds where they stayed from two weeks to two months, depending on the weather. The dry sheds had wooden roof panels that, when open, let in sunlight and, when closed, kept out the rain. The bricks were delivered initially by scow schooner and, later, by barge at the nearby docks (McNear, 2006).

For the first three decades of the twentieth century, McNear's Brickyard was a company town employing dozens of workers and their families. There were rows of houses for families on the western edge of the property, a boarding house, and dozens of small wood-frame bedroom huts for bachelors, all of whom took their meals in the Cookhouse (McNear, 2006). As mentioned above, the brickyard had a post office, and the area's first school was erected on site.

Although John McNear's son, Erskine McNear, had taken over the day-to-day operations of the brickyard by the 1890s, Erskine did not own the brick business until 1922 when he purchased his two brothers' (John A., Jr. and George P.) interests, following the death of their father in 1918. At this point, The McNear Company became a corporation owned by Erskine McNear, his four children, and a son-in-law (McNear, 2006).

Well-known buildings constructed from McNear brick in the Bay Area in the 1920s included the Sigma Pi Fraternity House (now Phi Delta Gamma) at UC Berkeley, the Bellevue-Staten Apartments on Oakland's Lake Merritt, and the Shrine Hospital for Crippled Children (now condominiums) in San Francisco (McNear, 2006).

By 1930, the demand for bricks had substantially decreased in response to the general downturn in the construction trade associated with the Great Depression. McNear's Brickyard stopped the production of bricks in 1933, and by this time, the brickyard was covered with millions of unsold bricks stacked ten feet high. Although brick manufacturing was suspended during the Depression years, the McNear Company started to manufacture Haydite in 1931. Haydite is a lightweight aggregate made by heating shale to about 2,200 degrees, cooling and crushing it.⁴ To

⁴ Haydite was invented in Texas by Stephen Hayde. Texas has very little rock from which to make concrete aggregate for road bases. As a result, concrete has to be hauled great distances. The Golden Gate Bridge was paved with lightweight concrete made with McNear Haydite (later removed in the 1980s to overhaul the roadbed). During World War II, floating drydocks were also made with McNear Haydite (McNear, 2006).

manufacture Haydite at the McNear site, a rotary cement kiln was brought in from Cement Hill, near Fairfield, CA. (McNear, 2006). Also in the 1930s, Lawrence P. McNear ran McNear's Beach County Park as a resort, rented fishing boats, and expanded his dynamite business. Miller McNear ran the dairy located to the west of the brickyard marsh, as well as the Haydite aggregate plant. The dairyman's house was occupied until the mid-1980s by Bob Thomas, Jr., a great-great grandson of John A. McNear.

Brick production resumed in 1946, and by this time, clay mining and brick delivery methods had changed yet again. Clay mining went from diesel-powered shovels to front end loaders, and delivery changed from barge to truck. The company's first fork lift truck was bought in 1949 and revolutionized handling of brick in the yard. Previously, brick had to be hand stacked onto flat bed trucks or placed into dump trucks. When the brickyard restarted there was not enough dry shed space for use by both Hoffman kilns. With fork lifts it was possible to place thousands of green (unfired) brick in the open yard (McNear, 2006).

Erskine McNear sold his interest in The McNear Company to his children and his son-in-law in 1950. In 1953, a Steele Model 40 pug mill and brick extruder was installed, replacing an earlier steam-driven machine. By this time, the Ferris wheel brick cutter had been replaced by a side cutter. Other facilities were added in the 1950s, including three storage barns, a restroom for workers, an accounting office, steel bunkers, and brick dryers.

In the Spring of 1955, The McNear Company sold 2,200 acres of its holdings to Stegge Development Co., retaining about 330 acres encompassing the brickyard, brickyard marsh, and quarry. Much of the land that was sold off was subdivided for residential development, and ultimately became the Glenwood and Peacock Gap neighborhoods and China Camp State Park.

The first of three new field kilns was built in the spring of 1956, the last constructed in 1961. The field kilns originally held about a half million bricks, and were lengthened in 1963 to hold 750,000 bricks. The kilns also transitioned from diesel to natural gas fuel in the early 1960s. A small hill located in the center of the brickyard was graded to make way for the new field kilns, and much of the soil was used to fill portions of the Bay, which prior to this time stretched much further inland than it does today. With the completion of the field kilns in 1961, the older Hoffman kilns were abandoned. A new crushing and screening plant was constructed in 1968, replacing earlier facilities called the drypan and hammermill (McNear, 2006).

Throughout the 1950s and 60s, McNear produced a variety of brick products, including jumbo brick (1957), tumbled bricks (1960), and Slumplite block (1962).

In 1971, Lawrence P. McNear died and The McNear Co. sold the remaining 330 acres, including the brickyard, Quarry, and dairy land to Dillingham Construction Co., the parent company of Basalt Rock Co., which was managing the Quarry by this time. The McNear Co. continued to operate the brickyard in a lease-back arrangement. By 1972, The McNear Co. stopped making Haydite aggregate because the Haydite plant was obsolete and the material was no longer profitable. A Ferro-type tunnel kiln was constructed in 1977, which unlike a field kiln, employs a

continuous process similar to the Hoffman kiln. However, instead of moving a coal fire through stationary brick, a tunnel kiln moves brick on railroad cars through a gas fire. Waste heat is collected at the end and sent to a dryer. Due to this conversion, the dry sheds were no longer needed and became used for brick storage, which is their current use today.

In 1980 the field kilns were abandoned due to rising natural gas prices. The field kilns are currently used for brick storage; their walls have mostly been destroyed. The tunnel kiln was doubled in length in 1981 and could fire about 325,000 brick a week. By 1985, the nearby clay pit had become depleted and clay soils had to be imported by truck to maintain brick production. Local contractors with waste dirt from house pads, trenches, swimming pools, and other uses delivered the soil to the brickyard instead of hauling it to the county landfill, recycling about 40,000 tons of soil a year.

In February, 1986 Dillingham Construction Co. sold the land and the Quarry to Dutra Construction Co., who leased the site back to The McNear Co. for continued brick manufacturing.

In 1990, a Steele Model 90 brick machine was installed, along with four new bunkers to replace the bunker in use since 1904. In 1991, The McNear Co. was renamed McNear Brick & Block, and a variety of new brick and block types were manufactured throughout the 1990s, including Versa-Lok (1992), Tudor brick (1993), Tango block (1994), Hollandstone block (1996), and Cobblestone block (1997).

Although the family sold the brickyard land to the Dillingham Corporation in 1971, which in turn sold the land to the Dutra Construction Co. in 1986, the McNear family continues to operate their brick company under a long-term lease arrangement with Dutra. McNear Brick & Block is operated by John A. McNear's fourth generation descendants, and is one of California's oldest brickyards.

McNear's Dairy (on-site). McNear's Dairy was part of the McNear family's extensive holdings and operations at Point San Pedro beginning in the late nineteenth century. There were two McNear family dairy operations; the 'Little Dairy' located on the project site north of the brickyard marsh, and the 'Big Dairy,' located almost a mile to the northwest. The 'Big Dairy' was the larger and earlier of the two dairy operations, starting in the 1880s, while the "Little Dairy" was constructed in the 1890s. The 'Little Dairy' was primarily used for sick or calving cows (McNear, 2006). Both dairies flourished briefly during the Depression and War years, as the McNear family turned from brickmaking to its other enterprises. The remaining portions of the 'Big Dairy' include McNear's Barn, a large, two-story barn constructed of brick. It was unusual to find agricultural buildings on the West Coast constructed of materials other than wood. The selection of brick for this barn was most likely due to the fact that the brick material was so readily accessible and even possibly cheaper for Mr. McNear at the time, since the brickyard was so near to the site of the barn (ACRS, 1978). McNear's Barn is located within the Peacock Gap subdivision and was converted to condominiums in the early 1980s.

The buildings and structures associated with the ‘Little Dairy’ on the project site are in highly dilapidated condition, and most of them have been abandoned. The Hay Barn, although highly modified and dilapidated, is currently used for the storage and manufacture of molded concrete pavers by Marin Concrete Products, Inc., which leases the site from Dutra. The dairyman’s house is currently unoccupied and is also in a highly dilapidated condition.

McNear’s Beach County Park (off-site). McNear’s Beach County Park, located just outside of the project area, was once the garden spot of the McNear family ranch and the former ‘Glen’ resort. The family sold the property in 1959, and it was later bought by the Marin County Parks and Recreation Department in 1970 to be used as a regional park. The County developed the natural beach area into McNear Beach County Park, which offers a swimming pool, tennis courts, family and group picnic sites, a sandy beach, lawn areas, snack bar, and a 500 foot long fishing pier (Marin County, 2006). By 1986, only two structures remained from the McNear era; a circa 1880s wood frame barn, and the circa 1890s simple wood frame home of George P. McNear (Sonoma State University, 1986). Today, only the barn appears to remain standing in the park. It is used as offices and equipment storage for parks staff.⁵

Former U.S. Army Signal Corp Structures (on-site). Located on the hill between the Main Quarry Bowl and the brickyard are three structures previously associated with the U.S. Army Signal Corp in the 1930s and 1940s for use in landing the rigid airships at Crissy Field in San Francisco’s Presidio Army Base. In the 1930s, rigid airships such as the Macon and the Akron were used to patrol the Pacific during heightened, pre-World War II tensions with Japan. The small Army Signal House, constructed circa 1935 in a Spanish Revival Style, was used by the Army to triangulate the airship landings, and had a clear line-of-sight with Crissy Field. Two other buildings, a small Army officer’s residence and a larger barracks for enlisted men, were constructed near the Signal House in the 1940s. Although recently remodeled on the interior for use as a guest house, the exterior of the Army Signal House is in fairly original condition. Both the officer’s residence and the barracks have been substantially remodeled and no longer retain their 1940s appearance. The former barracks is currently used as a residence.

Results of the Archival Records Search

The staff of the California Historical Resources Information System’s Northwest Information Center (NWIC) at Sonoma State University, Rohnert Park, California, completed a record search of the Project Area on July 11, 2006 (File No. 06-19). The search covered previous archaeological surveys and recorded sites for the Project Area and ¼ mile beyond its boundaries. The record search included a review of the National Register of Historic Places (NRHP) due to its significance in the identification of historic resources and the assessment of impacts, the California Register of Historical Resources (CRHR), the California Inventory of Historic Resources (1976), the listing of California Historical Landmarks (1990), the California Points of Historical Interest listing (May 1992 and updates), the Historic Property Directory (Office of Historic Preservation) current computer list, the Survey of Surveys (1989), General Land Office

⁵ The wood frame house could not be located during the ESA reconnaissance survey of July 15–16, 2006, and may no longer exist.

Plats or government-funded surveys, and other pertinent historic data available at the NWIC for each specific county.

The results of the archival search indicated that there are three previously recorded archaeological sites within the boundaries of the project site. These were Native American shell midden sites originally recorded by Nelson in 1907 (CA-MRN-105, -106, and -107) and were located on the south margins of Point San Pedro. With regard to site CA-MRN-105, Nelson states in 1907 that,

“The site is at present a brick factory. There was here, according to several independent informers, a shell-mound of considerable size; but as to its actual dimensions and history nothing definite is to be gathered from the shifting workmen making up most of the inhabitants of the neighborhood. It is possible however that some of the McNear family might furnish the desired information.”

The sites have likely been destroyed since their original recordation by Nelson, for no additional information is available on their integrity or condition. Moreover, these sites are highly vulnerable to wind and water erosion, especially wave action that has likely removed all but the deepest layers of the midden. Twentieth century shoreline fill activities may have additionally obscured these sites. Two additional shell mound sites recorded by Nelson, CA-MRN-108, -109, were located on the northern shores near McNear’s Beach County Park and along the southern margins of the peninsula.

No historic resources have been previously recorded on the project site. Recorded historic resources in the project vicinity include China Camp, located just north of the project site, which is listed in the National Register of Historic Places, and is California State Historical Landmark # 924. Located over a mile northwest from the project site at 121 Knight Drive is the Erskine B. McNear House, named for John Augustus McNear’s son, Erskine McNear. The home was constructed in 1906 and designed by renowned architect Brainerd Jones. This historic home is listed on national, state, and local historical registers. McNear’s Barn, located within the Peacock Gap Golf & Country Club about one mile northwest from the project site, was determined eligible for listing in the National Register of Historic Places (OHP, 2006).

The records search revealed an archaeological survey completed in 2001 which evaluated the McNear Brick & Block site for the location of wireless gear on the top of the brickwork’s 53-foot-tall smokestack. The survey results noted that, “the brick manufacturing at this site has taken place for over 100 years, and early buildings, structures, and a reservoir still exist. In sum, the McNear Brick & Block site is highly significant in the prehistory and history of Marin County (in particular San Rafael), and it is most likely eligible for inclusion in both the National and California registers” (Archaeological Resources Technology, 2001).

Results of the Site Reconnaissance Survey

Archaeological Resources

A reconnaissance-level survey of the project site was conducted by an ESA archaeologist in August, 2006. Given the extensive modification of the landscape and general lack of surface visibility, the survey focused on the margins of the peninsula along the San Pablo Bay and the area west of the Quarry. The purported location of two Nelson (1909) shellmound sites (CA-MRN-106 and MRN-107) were inspected for evidence of shell refuse, and the berm along the water edge was inspected for dark soil horizons and residues. No archaeological deposits were identified. The extensive wave action and rock deposits from the Quarry operations have clearly eroded or destroyed much of the original shoreline. The extensive disturbance has likely also affected CA-MRN-105, which was tentatively plotted by Nelson at or near the present McNear brick works location. Previous efforts to locate all of the above sites have been unsuccessful (Flynn & Kallenback, 1998).

While it appears the peninsula now occupied by the SRRQ was used for shellfish procurement and processing, much of the evidence of this behavior has been destroyed by natural phenomena and modern development. The majority of confirmed archaeological sites have been recorded west of the project site near the Glenwood residential community. Most of these sites are found within the limits of either the McNear mansion or the McNears' estate that have been incorporated into several residential subdivisions. These sites also appear to cluster around fresh water resources and exhibit long-term habitation patterns. None of these sites appear to be affected by the proposed Quarry operations and future reclamation of the site.

Historic Architectural Resources

The project site was the subject of a reconnaissance-level survey by an ESA preservation planner/architectural historian on July 15-16, 2006. All standing buildings and structures were recorded, photographed, and evaluated for their potential historical significance. The survey revealed numerous standing structures associated not only with the McNear Brickyard constructed around the turn of the twentieth century, but also other McNear family operations at Pt. San Pedro such as a dairy. More recent structures associated with the former U.S. Army Signal Corps, as well as Dutra Quarry, were also recorded. All recorded buildings and structures are identified on Table 4.12-1. Photographs of all buildings and structures on the project site, keyed to contemporary maps and tables, are located in Appendix A. Historic photos are provided in Appendix B. Although located off-site, McNear's Beach County Park was also investigated for remnants of the former uses in this location. Finally, the Erskine B. McNear home at 121 Knight Drive was also investigated.

**TABLE 4.12-1
RECORDED BUILDINGS AND STRUCTURES**

	Building Name/Use (Material)	Age	Condition
McNear's Brickyard			
1	Boarding House (wood frame)	c. 1902	Fair
2	Office (stuccoed brick)	c. 1902	Good/remodeled
3	Cookhouse (stuccoed brick)	c. 1902	Good/remodeled
4	Hoffman Kiln #1 (brick, wood frame, corrug. steel)	c. 1902	Fair
5	Dry Sheds (wood frame)	c. 1902	Fair/extended
6	Bunker (wood frame, steel)	c. 1904	Poor/dilapidated
7	Hoffman Kiln #2 (brick, wood frame, corrug. steel)	c. 1904	Fair
8	Caretaker's Residence (wood frame)	c. 1910s	Good/remodeled
9	Bachelor's Huts (3 – wood frame)	c. 1910s	Poor/relocated
10	Workman's Shed (stuccoed brick, wood frame)	c. 1910s	Fair/remodeled
11	Storage Barn (wood frame)	c. 1950s	Fair
12	Bunker (steel)	c. 1950s	Pool/dilapidated
13	Restrooms (brick)	c. 1950s	Good
14	Storage Barn (concrete block, corrug. steel)	c. 1950s	Fair/extended
15	Accounting Office (brick)	c. 1950	Good/remodeled
16	Shop (brick)	c. 1956	Good
17	Dryer (corrug. steel, woodframe)	c. 1950	Fair
18	Field Kilns (3 - brick)	1956 - 61	Poor/dilapidated
19	Crushing/Screening Plant (corrug. steel, woodframe)	1968	Good
20	Ferro Tunnel Kiln & Dryer (corrug. steel, wood frame)	1977, 1981	Good
21	Steele Model 90 Brick Machine & 4 Steel Bunkers (corrug. steel, woodframe)	1990	Good
McNear's Dairy Structures			
22	Hay Barn (corrug. steel, wood frame)	c. 1890s	Poor/dilapidated
23	Cow Barn (wood frame)	c. 1890s	Poor/dilapidated
24	Dairyman's House (wood frame)	c. 1890s	Poor/dilapidated
25	Milking Shed (brick, wood frame, corrug. steel)	c. 1890s	Poor/dilapidated
26	Chicken Coop (wood frame)	c. 1890s	Poor/dilapidated
U.S. Army Signal Corp Structures			
27	Signal House (stucco, wood frame)	c. 1935	Good/remodeled
28	Officer's Residence (wood frame)	c. 1940s	Good/remodeled
29	Enlisted Barracks (Dutra Home – stucco, wood frame)	c. 1940s	Good/remodeled
Dutra Quarry Structures			
30	Pier (wood pilings)	c. 1960s	Good
31	Lube Shop (corrug. steel)	c. 1960s	Good
32	Guardhouse (corrug. & sheet steel)	c. 1960	Good
33	Quarry Office	c. 1980	Good/remodeled
34	Fabrication Shop (corrug. steel)	c. 1985	Good
35	Electrical Shop (corrug. steel)	c. 1985	Good
36	Mobile Equipment Shop (corrug. steel)	c. 1985	Good
37	Quality Control Lab (corrug. steel)	c. 1985	Good
38	Asphalt Plant (sheet steel)	c. 1985	Good
39	Primary Crushing Plant (sheet steel)	c. 1995, 2001	Good
40	Secondary Crushing Plant (sheet steel)	c. 1995	Good

SOURCE: ESA, 2006

Regulatory Framework

Marin Countywide Plan Update 2007, Historic and Archaeological Resources Policies

The Marin Countywide Plan is the County's long range guide for use of land and protection of natural resources. The Plan sets forth policies and programs to be used by the public, planning staff, and decision makers when reviewing and analyzing proposed development. Countywide Plan goals and policies related to historic and archaeological resources are discussed in the Section 4.6, Land Use and Planning.

The Marin Countywide Plan Update identifies no cultural resources on the project site. The Plan does, however, identify the Erskine B. McNear House and China Camp as historic resources located in the vicinity of the project area.

California Register of Historic Resources

The California Register of Historic Resources (CRHR) is an authoritative guide to the state's historical resources, and by which properties are considered significant for California Environmental Quality Act (CEQA) purposes. The CRHR includes resources listed in or formally determined eligible for listing in the National Register of Historic Places (NRHP – see discussion below), California State Landmarks, and Points of Historical Interest. The State Office of Historic Preservation (OHP) maintains a list of historic resources by county in their Directory of Properties in the Historic Property Data File. A building or structure identified on OHP's Directory with a rating of 1 or 2 (on or determined eligible for the National Register) is considered to be "listed" on the CRHR.

Properties of local significance that have been designated under a local preservation ordinance (i.e., local landmarks), or that have been identified in a local historical resources inventory may also be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA.

In order for a resource to meet the criteria for listing in the CRHR, it must satisfy all of the following three provisions:

1. It meets one of the following four criteria of significance (PRC 5024.1(c) and CEQA *Guidelines* 15064.5):
 - (a) the resource "is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage."
 - (b) the resource "is associated with the lives of persons important in our past.
 - (c) the resource "embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;" or

- (d) the resource “has yielded, or may be likely to yield information important in prehistory or history” (this criterion applies primarily to archaeological sites).
2. The resource retains historic integrity; and
3. It is fifty years old or older (except where it can be demonstrated that sufficient time has passed to understand the historical importance of the resource).

The state CEQA *Guidelines* indicate that projects that are consistent with the *Secretary of the Interior’s Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* generally “shall be considered as mitigated to a level of less than a significant impact on the historic resource” (Section 15064.5(b)(3)).

California Register Historic Resources on the Project Site and Vicinity

No buildings or structures on the project site are listed in or have been formally determined eligible for listing in the CRHR (i.e., on OHP’s Directory with a rating of 1 or 2). Buildings or structures listed in or have been formally determined eligible for listing in the CRHR in the project vicinity include the 1906 Erskine B. McNear house at 121 Knight Drive, and China Camp at 247 North San Pedro Road.

National Register of Historic Places

The National Register of Historic Places (NRHP) is the nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The NRHP is administered by the National Park Service, which is part of the U.S. Department of the Interior.

To be listed on the NRHP, a property must be shown to be “significant” at the local, state, or national level under one or more of the following criteria.

1. Criterion A (Event): That are associated with events that have made a significant contribution to the broad patterns of our history.
2. Criterion B (Person): That are associated with the lives of persons significant in our past.
3. Criterion C (Design/Construction): That embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction..
4. Criterion D (Information Potential): That have yielded, or may be likely to yield, information important in prehistory or history.

Integrity: The property must also possess historic “integrity.” Integrity is defined as “the ability of a property to convey its significance.” The National Register criteria recognize seven qualities that define integrity: location, design, setting, materials, workmanship, feeling, and association.

- “Location” refers to the place where the historic property was constructed.
- “Design” is the combination of architectural elements that create the form, structure and style of the property.
- “Setting” is the physical environment surrounding a historic property.
- “Materials” are the original physical components that were combined during a particular period in time and in a particular pattern to form the historic property.
- “Workmanship” is the physical evidence of the building crafts and skills of a particular culture during a given period.
- “Feeling” is a property’s expression of the aesthetic or historic sense of a particular period of time.
- “Association” is the direct link between an important historic event or person and a historic property.

Special considerations apply to moved or reconstructed properties, cemeteries, religious or commemorative properties, and properties achieving significance within the past 50 years. Properties listed in the NRHP are automatically listed in the CRHR.

National Register Historic Resources on the Project Site and Vicinity

No buildings on the project site or immediate vicinity are listed in or determined eligible for listing in the NRHP. The closest NRHP-listed building to the project site is the China Camp at 247 North San Pedro Road, and the Erskine B. McNear house at 121 Knight Drive.

Evaluation of Historical Significance

The discussion below provides an evaluation of the historical significance of McNear’s Brickyard, McNear’s Dairy, the former U.S. Army Signal Corp buildings, and the Dutra Quarry relative to the NRHP and CRHR evaluation criteria described above.

McNear’s Brickyard

Begun by early California settler and industrialist John A. McNear in 1869, McNear’s Brickyard has been in nearly-continuous operation for almost 140 years, making it one of the oldest if not *the* oldest brickyard in California. The brickyard was ideally located near its source materials and on the Bay for rapid ship transportation to anywhere in the Bay Area or the state. Numerous early structures remain from the turn of the twentieth century, including the two original Hoffman kilns, a worker’s cottage and boarding house, an office, a cookhouse, as well as many other structures associated with the brickmaking process, such as the sheds and bunkers. Although

numerous changes and additions to the buildings and the landscape have occurred within the last 50 years, many of the earliest structures retain sufficient integrity to convey their associations as an early brick manufacturing plant.

McNear's Brickyard appears to be eligible for listing on the National and California Registers under Criterion A/1, as one of California's earliest brickmaking industries, an important historical event in the state's and region's growth and economic development during the late nineteenth and early twentieth centuries, Criterion B/2, for its association with the life of John A. McNear, an early California settler and local industrialist, and for Criterion C/3, as many of the earliest buildings at the brickyard, especially the Hoffman kilns, embody the distinctive characteristics of a type or method of construction. Although beyond the scope of this report, McNear's Brickyard may also be eligible for listing in the National and California Registers under Criterion D/4, for its potential to yield information important to history and prehistory, especially due to the early Chinese camps which may have been located in the area.

Table 4.12-2 on the following page, identifies which buildings or structures at McNear's Brickyard appear to qualify as historic resources, due to their age, historical associations, and/or construction method. These structures are also identified in Figure 4.12-1. As shown in Table 4.12-2, the earliest buildings or structures at the site which remain in good-to-fair condition appear to qualify as historic resources. These are: 1) Boarding House; 2) Office; 3) Cookhouse; 4) Hoffman Kiln #1; 5) Hoffman Kiln #2; 6) Dry Sheds; 7) Caretaker's Residence; and 8) Worker's Shed. Although the c. 1904 bunker and c. 1910s bachelor's huts are early brickyard remnants, they do not have sufficient integrity to convey their historic associations due to their highly dilapidated condition. In addition, the bachelor's huts have been relocated, further reducing their integrity of setting and location. The other resources, constructed since the 1950s, do not appear to be eligible for listing in the NRHP or CRHR due to their relatively recent dates of construction and general lack of architectural significance.

McNear's Dairy

The McNear's Dairy is associated with the extensive McNear family holdings and operations at Point San Pedro in the late nineteenth and early twentieth centuries. Although greater than 50 years old and having associations with the McNear family enterprises at Point San Pedro, these buildings do not have sufficient integrity to convey their earlier associations with the McNear's dairy operations due to their highly dilapidated condition, and general lack of architectural significance. In addition, the larger and more architecturally significant McNear's Barn at the 'Big Dairy' is preserved within Peacock Gap Golf & Country Club as condominiums, and has been previously determined eligible for listing on the NRHR. Although these buildings at McNear's 'Little Dairy' could be restored in the future, they do not currently appear to meet the criteria for listing in the NRHP or CRHR.

**TABLE 4.12-2
HISTORIC RESOURCES ON THE PROJECT SITE**

	Building Name/Use (Material)	Age	Condition	Historic Resource?
McNear's Brickyard				
1	Boarding House (wood frame)	c. 1902	Fair	Yes
2	Office (stuccoed brick)	c. 1902	Good/remodeled	Yes
3	Cookhouse (stuccoed brick)	c. 1902	Good/remodeled	Yes
4	Hoffman Kiln #1 (brick, wood frame, corrug. steel)	c. 1902	Fair	Yes
5	Dry Sheds (wood frame)	c. 1902	Fair/extended	Yes
6	Bunker (wood frame, steel)	c. 1904	Poor/dilapidated	No
7	Hoffman Kiln #2 (brick, wood frame, corrug. steel)	c. 1904	Fair	Yes
8	Caretaker's Residence (wood frame)	c. 1910s	Good/remodeled	Yes
9	Bachelor's Huts (3 – wood frame)	c. 1910s	Poor/relocated	No
10	Worker's Shed (stuccoed brick, wood frame)	c. 1910s	Fair/remodeled	Yes
11	Storage Barn (wood frame)	c. 1950s	Fair	No
12	Bunker (steel)	c. 1950s	Pool/dilapidated	No
13	Restrooms (brick)	c. 1950s	Good	No
14	Storage Barn (concrete block, corrug. steel)	c. 1950s	Fair/extended	No
15	Accounting Office (brick)	c. 1950	Good/remodeled	No
16	Shop (brick)	c. 1950	Good	No
17	Dryer (corrug. steel, woodframe)	c. 1950	Fair	No
18	Field Kilns (3 - brick)	1956 - 61	Poor/dilapidated	No
19	Crushing/Screening Plant (corrug. steel, woodframe)	1968	Good	No
20	Ferro Tunnel Kiln & Dryer (corrug. steel, wood frame)	1977, 1981	Good	No
21	Steele Model 50 Brick Machine & 4 Steel Bunkers (corrug. steel, woodframe)	1990	Good	No
McNear's Dairy Structures				
22	Hay Barn (corrug. steel, wood frame)	c. 1890s	Poor/dilapidated	No
23	Cow Barn (wood frame)	c. 1890s	Poor/dilapidated	No
24	Dairyman's House (wood frame)	c. 1890s	Poor/dilapidated	No
25	Milking Shed (brick, wood frame, corrug. steel)	c. 1890s	Poor/dilapidated	No
26	Chicken Coop (wood frame)	c. 1890s	Poor/dilapidated	No
U.S. Army Signal Corp Structures				
27	Signal House (stucco, wood frame)	c. 1935	Good	Yes
28	Officer's Residence (wood frame)	c. 1940s	Good/remodeled	No
29	Enlisted Barracks (Dutra Home – stucco, wood frame)	c. 1940s	Good/remodeled	No
Dutra Quarry Structures				
30	Pier (wood pilings)	c. 1960s	Good	No
31	Lube Shop (corrug. steel)	c. 1960s	Good	No

**TABLE 4.12-2 (continued)
HISTORIC RESOURCES ON THE PROJECT SITE**

	Building Name/Use (Material)	Age	Condition	Historic Resource?
Dutra Quarry Structures (cont.)				
32	Guardhouse (corrug. & sheet steel)	c. 1960s	Good	No
33	Quarry Office	c. 1980	Good/remodeled	No
34	Fabrication Shop (corrug. steel)	c. 1985	Good	No
35	Electrical Shop (corrug. steel)	c. 1985	Good	No
36	Mobile Equipment Shop (corrug. steel)	c. 1985	Good	No
37	Quality Control Lab (corrug. steel)	c. 1985	Good	No
38	Asphalt Plant (sheet steel)	c. 1985	Good	No
39	Primary Crushing Plant (sheet steel)	c. 1995, 2001	Good	No
40	Secondary Crushing Plant (sheet steel)	c. 1995	Good	No

Source: ESA, 2006

U.S. Army Signal Corp Structures

As described above, three structures previously associated with the U.S. Army Signal Corp in the 1930s and 1940s are located on the hill between the Main Quarry Bowl and the brickyard. The small Army Signal House, constructed circa 1935 in a Spanish Revival Style, was briefly used by the Army to triangulate the rigid airship landings at Crissy Field in San Francisco. Two other buildings, a small Army officer's residence and a larger barracks for enlisted men, were constructed near the Signal House in the 1940s, and later substantially remodeled. Only the Signal House appears to qualify for listing in the NRHP and CRHR under Criterion A/1 for its associations with the Army Signal Corp and the brief use of rigid airships to patrol the Pacific before and during World War II, as well as Criterion C/3, for its embodiment of the Spanish Revival style of architecture. The other buildings do not appear to qualify for listing in the NRHP and CRHR as no longer retain sufficient integrity to convey their previous World War II-era historical associations, primarily due to the substantial alterations which have occurred to them since the 1940s.

Dutra Quarry

The Dutra Quarry site has been an active quarry since the late 1800s, beginning with three smaller quarries; Jordan, Bull, and Marin Quarries. By the turn of the twentieth century, the quarries became part of the extensive land holdings and enterprises of the McNear family, who retained ownership of the quarries until 1971 when it was sold to Dillingham Corporation, and later to Dutra Inc. in 1986, which operates the Quarry today. Although quarrying at the site has occurred for over 130 years and was associated at one time with John A. McNear, the site's landforms have changed substantially as the Main Quarry Bowl has been deepened and widened

within the last 50 years, eliminating all traces of the earlier three quarries or any associated Quarry structures. As none of the existing buildings or structures on the Quarry site is 50 years old or older, they are not of sufficient age to be considered for listing in the NRHP or CRHR. As such, neither the Quarry buildings nor the Quarry site itself appears to be eligible for listing in the NRHP or CRHR.

Impacts and Mitigation Measures

This section identifies potential project impacts to prehistoric archaeological resources, paleontological resources, followed by potential impacts to historical resources. Because varying types of actions are associated with each phase of the project, the following discusses impacts to each type of cultural resource by phase (Project Phases 1 – 4), where applicable. In some cases, project impacts would apply to all phases. Mitigation measures are provided on pages 4.12-27 – 34.

Significance Criteria

According to Appendix N of the Marin County Environmental Impact Review Guidelines, *Criteria for Significance and List of Ministerial Projects* (Marin County, 1994), the significance criteria for impacts to historical and archaeological resources is generally determined by whether federally or State-listed resource are affected by the project, as follows:

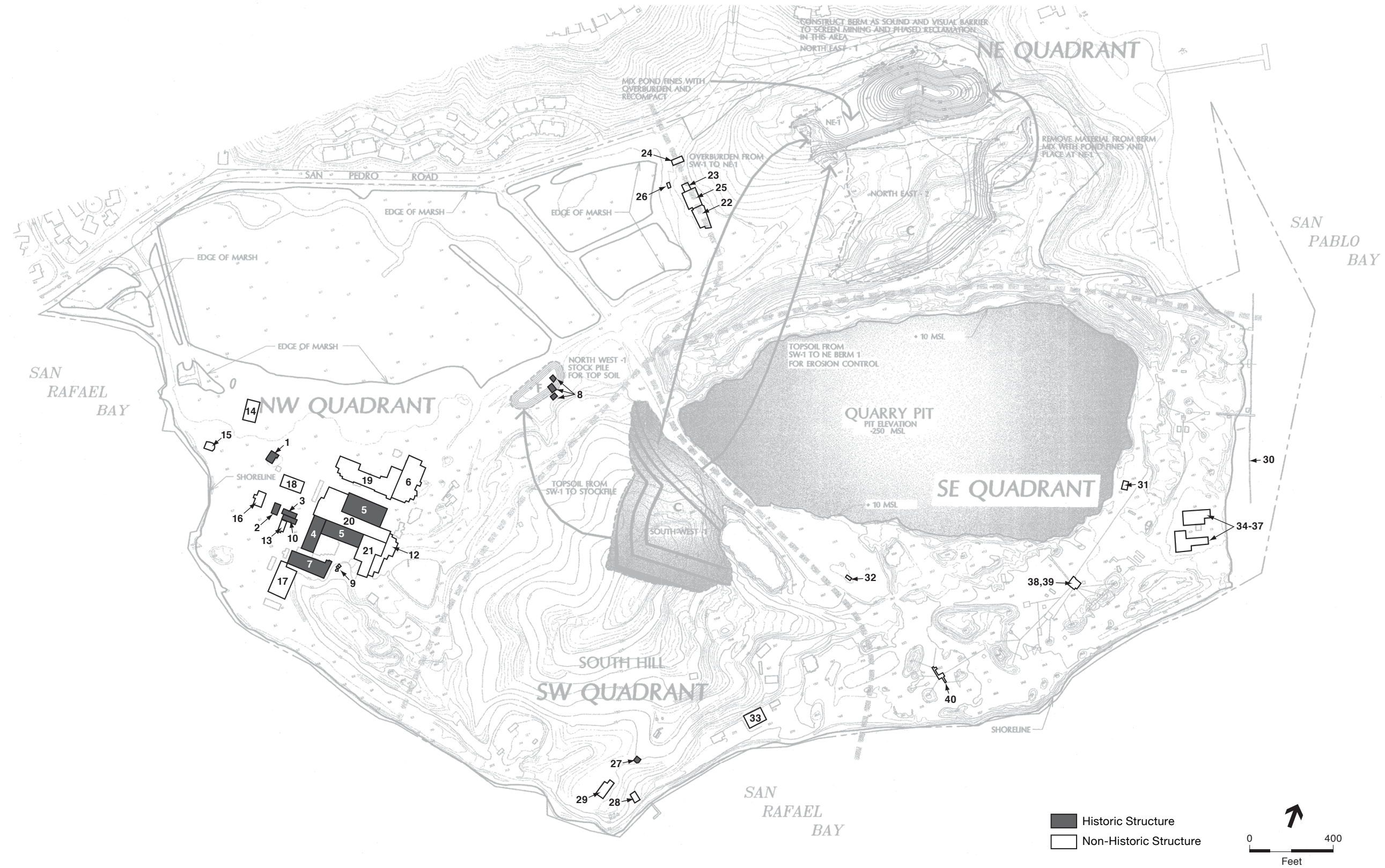
- Does the project disrupt or adversely affect a prehistoric or archaeological site, or a property of historic or cultural significance to a community or ethnic or social group, or a paleontological site, except as part of a scientific study?
- Does the project affect a local landmark of local cultural/historical importance?

Impact Mechanisms

Impacts on cultural resources could result from the following project-related activities or project design elements:

Ground-disturbing activities. Project-related excavation, grading, trenching, or other sub-surface disturbance could damage or destroy buried archaeological or paleontological resources including prehistoric and historic remains, human burials, or significant fossil deposits.

Damage, destruction, or alteration of historic buildings. Project-related demolition, damage, or alteration of historic buildings or their immediate surroundings could impair the significance of a historic resource or adversely alter those physical characteristics of an historical resource that convey its historical significance.



SOURCE: San Rafael Rock Quarry

San Rafael Rock Quarry ARP and AQP EIR . 205145

Figure 4.12-1
Historic Structures
on the Project Site

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Impacts of the Amended Reclamation Plan

Due to the long duration of heavy disturbance at the Quarry facility and the surrounding area, there is a dearth of information regarding the prehistoric occupation on Point San Pedro. Much of the known archaeological record is reflected in Nelson's (1909) survey of the San Francisco Bay shoreline. As such, the only identified archaeological sites within the reclamation areas were shell deposits located along the margins of the Bay and in the wetland areas. Subsequent efforts to re-identify these sites or any previously unknown sites, including those conducted for the purposes of this Environmental Impact Report (EIR), have been unsuccessful. Natural processes of sedimentation and wave action have likely destroyed or substantially altered these sites at the surface. Sea-level changes over the past 10,000 years have also likely inundated early habitation or task sites. However, subsurface components may still be intact in some cases. The NW and SE Quadrants appear to represent the areas that possess the greatest sensitivity for subsurface archaeological resources.

Impact R4.12-1: Phased reclamation grading activities could result in adverse effects to prehistoric or unique archaeological resources, including those previously unidentified (Significant).

The following discussion is divided by planned reclamation phase. Refer to the figures and description in Chapter 3, Project Description.

Reclamation Phase 1

The removal of topsoil in SW-1 to the fill location in the NW Quadrant may deposit fill material and cap an area near the last known location of CA-MRN-105, which was recorded adjacent to the c. 1910 Caretakers residence (see Historical Resources Impacts below). As mentioned, this site was not successfully rediscovered and has likely been destroyed. Even if subsurface material associated with this site exists in this area, the action of filling the area with topsoil will not adversely affect the site. No other actions associated with this reclamation phase appear to impact known archaeological resources.

Because unrecorded, poorly recorded, or unknown cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. This impact is addressed in Mitigation Measure R4.12-1a.

Phase 2

The proposed actions linked to this phase would not impact any known archaeological resources. However, because unrecorded or unknown cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. This impact is addressed in Mitigation Measure R4.12-1a.

Phase 3

The proposed actions linked to this phase would not impact any known archaeological resources. However, because unrecorded, poorly recorded, or unknown cultural resources could exist anywhere in the construction zone, this project could result in significant impacts to cultural resources. This impact is addressed in Mitigation Measure R4.12-1a.

Phase 4

The regrading and erosion control operations proposed for the Southeast Quadrant may adversely affect undocumented components of archaeological sites CA-MNT-106 and CA-MNT-107 along the margins of the shoreline. Due to the poorly recorded and unknown extent of these sites, the construction activities in this area may disturb unrenovable elements of these sites.

This impact is addressed in Mitigation Measures R4.12-1a and R4.12-1b.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.12-1a (applies to all project phases): In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Agency Director.

Mitigation Measure R4.12-1b (applies to project Phase 4 of reclamation grading): The applicant shall retain the services of a qualified archaeological consultant who has expertise in California prehistory to review reclamation grading plans and identify areas of potential concern, including previously undisturbed or minimally disturbed areas. The archeological consultant shall monitor all ground-disturbing or vegetation removal activities in identified areas of concern during construction to ensure that any previously undiscovered cultural resources are properly identified and preserved or otherwise mitigated in accordance with prevailing professional standards and Public Resources Code §21083.2. If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit will cease. The archaeological monitor will be empowered to redirect crews and heavy equipment until the deposit is evaluated. The monitor will immediately notify the Marin County Department of Public Works of the encountered archaeological deposit. The monitor will, after making a reasonable effort to assess the identity, integrity, and

significance of the encountered archaeological deposit, present the findings of this assessment to Marin County. If Marin County, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, the applicant shall take steps to :

- Redesign the project to avoid any adverse effects on the significant archaeological resource; or
- Develop and implement an archaeological data recovery program (ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance and that interpretive use of the resource is feasible). If the circumstances warrant an archaeological data recovery program, an ADRP will be conducted that will preserve and recover important archeological data from the find, to the extent that adverse effects will be avoided. The project archaeologist will consult with Marin County to determine the scope of the ADRP. The archaeologist will prepare a draft ADRP that will be submitted to Marin County and the state Office of Historic Preservation for review and approval. The ADRP will identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP will identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods will not be applied to portions of the archaeological resources if nondestructive methods are practical.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.12-1: Prior to issuance of the Phase 4 Grading Permit for ground disturbing reclamation activities, the applicant will present to Marin County Department of Public Works written procedures for compliance with the above mitigation measures. Compliance monitoring, and any consultations and approvals by the County required in the above mitigation measures, will be the responsibility of the Marin County.

Level of Significance after Mitigation

Implementation of Mitigation Measures R4.12-1a and R4.12-1b would reduce this impact to less than significant levels.

Impact R4.12-2: Activities associated with proposed phased reclamation grading could have an adverse effect on paleontological resources (Less than Significant).

Point San Pedro is primarily underlain by sandstone and shale of the Franciscan Assemblage (Blake, 2000). The sandstone at the site has been identified as a graywacke sandstone that is relatively intact by comparison to other exposures of Franciscan rocks (ENGEO, 2005). While

these types of sediments have the potential for harboring paleontologic resources that would qualify as significant—in terms of scientific importance—for the purposes of CEQA (CEQA *Guidelines* 15064.5[a][3]), the considerable rock removal that has occurred at the Quarry site has not revealed any significant fossil deposits. A review of the University of California Museum of Paleontology localities for Marin County indicates that deposits of invertebrates have been identified near Point San Pedro; however, no specimens are on record at the museum (UCMP, 2006).

Excavation and reclamation activities can have a deleterious effect on such resources if present. However, the likelihood of such resources being present on the site is low, and the impact is therefore considered less than significant.

Mitigation: None required.

Impacts to Historic Resources

As described in the Setting section, there are eight structures located on the McNear's Brickyard site constructed between c. 1902 – c.1910 which appear to be eligible for listing on the National and California Registers. These are: 1) Boarding House; 2) Office; 3) Cookhouse; 4) Hoffman Kiln #1; 5) Hoffman Kiln #2; 6) Dry Sheds; 7) Caretaker's Residence; and 8) Worker's Shed. These structures are considered historic resources pursuant to CEQA Section 15064.5. All of these buildings and structures are located in the NW Quadrant of the project plan. In addition, the c. 1935 U.S. Army Signal Corp Signal House also appears to qualify for listing in the NRHP and CRHR, and as such, is also considered a historic resource pursuant to CEQA Section 15064.5. This building is located in the SW Quadrant of the project plan. No historic resources were identified in other quadrants of the project site. The potential impacts to these structures are described below, by project phase.

Impact R4.12-3: Construction of the top soil stockpile fill area “F” under Phase 1 of the proposed project would demolish or substantially alter the c. 1910 Caretaker's Residence, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5 (Significant).

Under Phase 1 of the Grading Plan, the applicant would relocate 14,500 cubic yards of material from SW Quadrant area SW-1 to create a topsoil stockpile in the NW Quadrant in the immediate vicinity of the McNear's Brickyard Caretaker's Residence, potentially demolishing or substantially altering this potentially eligible historic resource (See Figure 3-7, Phase 1 Grading Plan, Fill Area “F”). Demolition or substantial alteration of a historic resource would be considered a significant impact of Phase 1 of the proposed project. No other impacts to historic resources are anticipated in Phase 1.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.12-3a: The project sponsor shall relocate the top soil stockpile fill area "F" under Phase 1 of the proposed project, to avoid potentially adverse effects to the Caretaker's Residence. The fill area could be relocated either to the east or to the west of this potentially eligible historic resource, or split into two smaller stockpiles, to avoid the resource.

Mitigation Measure R4.12-3b: Prior to commencement of Phase 1 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing stockpiles and haul routes, and protection of historic resources. The plan will clearly show how the Caretaker's Residence and other potentially eligible historic resources will be protected and preserved.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.12-3: The Marin County Department of Public Works will be responsible for review, approval, and monitoring implementation of the above-stated mitigation measures.

Level of Significance after Mitigation

Implementation of Mitigation Measures R4.12-3a and b, ~~and c~~ would reduce this impact to less than significant levels.

Impact R4.12-4: Construction of the surcharge berm under Phase 2 of the proposed project would demolish or substantially alter the McNear's Brickyard c. 1902 Boarding House and Office, two potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5 (Significant).

Under planned Phase 2 of reclamation grading, the applicant proposes to construct a surcharge berm in the NW Quadrant. The surcharge berm would be a boomerang-shaped fill structure covering about 5.6 acres, with a top deck elevation of +25' msl (15 feet above existing grade). The volume of the surcharge berm would be approximately 218,100 cubic yards, consisting of overburden material from South Hill and material currently stockpiled in the NE Quadrant, mixed with pond fines. This would require the demolition of some, but not all, of the existing McNear's Brickyard buildings, and would affect areas currently used for storage of materials and inventory.

Construction of the surcharge berm would demolish or substantially alter two potentially eligible historic resources at the McNear's Brickyard site; 1) c. 1902 Boarding House; and 2) c. 1902 Office. Demolition or substantial alteration of a historic resource would be considered a

significant impact of Phase 2 of the proposed project. No other impacts to historic resources are anticipated in Phase 2.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.12-4a: The project sponsor shall relocate and/or redesign the surcharge berm proposed under Phase 2 of the proposed project, to avoid potentially adverse impacts to the Boarding House and Office structures. The north-south leg of the berm could be narrowed to avoid these resources, allowing more fill to occur on the east-west portion of the berm. To ensure adherence to this mitigation measure, prior to commencement of Phase 2 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing the precise location of the surcharge berm, as well as areas that will be used to support construction of the berm. The plan will clearly show how the Boarding House and Office structures and other potentially eligible historic resources will be protected and preserved.

Mitigation Measure R4.12-4b: If relocation or alteration of the surcharge berm will affect the geotechnical properties of the site required for intended post-reclamation development, the applicant shall revise the conceptual design for the NW Quadrant Reclamation Plan accordingly.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.12-4: The Marin County Department of Public Works and the Marin County Community Development Agency will be responsible for review, approval, and monitoring implementation of the plan specified in Mitigation Measure R4.12-4a.

Level of Significance after Mitigation

Implementation of Mitigation Measure R4.12-4a and b,~~and c~~ would reduce this impact to less-than-significant levels.

Impact R4.12-5: Reclamation activities in the SW Quadrant under Phase 3 of the phased grading plan may demolish or substantially alter the former c. 1935 U.S. Army Signal House, a potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5 (Significant).

Phase 3 of reclamation grading under the 2004 Amended Reclamation Permit (ARP04) would remove the top two feet of topsoil from South Hill area SW-3 (24,900 cubic yards of material) and stockpile this material in the NW Quadrant for use in the NE Quadrant for erosion control. This phase would also remove eight feet of overburden from South Hill area SW-3 (74,800 cubic

yards of material), mix with 18,700 cubic yards of pond fines from the NE Quadrant stockpile, and create a new stockpile of mixed material within the SW Quadrant. The southernmost limits of these reclamation activities are immediately adjacent to, or may include, the former c. 1935 U.S. Army Signal House, which appears eligible for listing as a historic resource. These reclamation activities may demolish or substantially alter this historic resource. Demolition or substantial alteration of a historic resource would be considered a significant impact of Phase 3 of the proposed project.

Also under reclamation phase 3 of ARP04, the applicant would create a topsoil stockpile using 12,800 cubic yards of material from SW Quadrant area SW-1 in the NW Quadrant, in the general location of the McNear's Brickyard Caretaker's Residence, a potentially eligible historic resource. Phase 3 reclamation grading would also involve re-contouring and compacting the surcharge berm in the NW Quadrant to achieve final grades and compaction. This would occur in the general location of the McNear's Brickyard Boarding House and Office, two potentially eligible historic resources.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure R4.12-5a: The project sponsor shall redesign the reclamation activities in the SW and NW Quadrants under Phase 3 of the proposed project to avoid potentially adverse impacts to the former c. 1935 U.S. Army Signal House. The southernmost limits of the reclamation activity area could be reduced by approximately 100 feet to avoid this historic resource, potentially allowing more reclamation activities to occur on the northern, eastern, or western portions of SW-3.

Mitigation Measure R4.12-5b: The provisions of Mitigation Measures R4.12-3 and R4.12-4a to protect the Caretaker's residence and the McNear's Brickyard Boarding House and Office shall be kept in place for Phase 3 reclamation grading.

Mitigation Measure R4.12-5c: To ensure adherence to mitigation measures R4.12-5a and b, prior to commencement of Phase 3 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing reclamation grading activities. The plan will clearly show and describe how the affected potentially historic resources, including the c 1935 U.S. Army Signal House, the Caretaker's residence, and the McNear's Brickyard Boarding House and Office structures, as well as any other potentially eligible historic resources will be protected and preserved.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.12-5: The Marin County Department of Public Works and the Marin County Community Development Agency will be responsible for review, approval, and monitoring implementation of the plan specified in Mitigation Measure R4.12-5c.

Level of Significance after Mitigation

Implementation of Mitigation Measure R4.12-5a-c would reduce this impact to less than significant levels.

Impact R4.12.-6: Reclamation grading phase 4 of the 2004 Amended Reclamation Permit would demolish four potentially eligible historic buildings at McNear’s Brickyard, including 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4)c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker’s Shed. Even with the possible retention of Hoffman Kiln #1 under the Amended Reclamation Plan, Phase 4 would additionally alter the historic setting of Hoffman Kiln #1 to the extent that it would no longer qualify for listing in the National Register of Historic Places or California Register of Historic Resources (Significant).

Under the Phase 4 of the proposed reclamation grading, operations at McNear’s Brickyard would terminate, and all buildings not scheduled for use under the Development Plan (to be developed three years prior to cessation of quarrying operations, per the Conditions for Approval for ARP82) would be demolished. It is likely that the brick kiln and stack would be retained, and the grading plan reflects that this area would not be disturbed, but the ARP is not definitive on this point.

Phase 4 of the proposed project would have the most profound effects to historic resources of any of the project phases, as it would demolish nearly all structures at McNear’s Brickyard, with the possible exception of one brick kiln and its stack (assumed to be, but not specifically identified, as Hoffman Kiln #1). As it is uncertain which buildings would be scheduled for reuse under the Development Plan, it is conservatively assumed that the following historic structures would be demolished; 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4) c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker’s Shed. Demolition of these historic resources would be considered a significant impact of Phase 3 of the proposed project.

While the ARP’s possible retention of Hoffman Kiln #1 and its stack would be considered to be a beneficial aspect of planned reclamation should this occur, demolition of all other resources associated with the McNear’s Brickyard, re-grading the NW Quadrant, and development of new neighborhood commercial uses would substantially alter the historic setting of this structure to the extent that it would no longer qualify for listing in the NRHP or CRHR. Substantial alteration to the setting of this historic resource would also be considered a significant impact of Phase 3 of the proposed project.

Mitigation Measures Proposed as Part of the Project

Mitigation Measure R4.12-6a: The ARP states that one of the Hoffman Kilns and its stack may be retained in the post-reclamation development.

Mitigation Measures Identified in this Report

Mitigation Measure R4.12-6b: The project sponsor shall revise the applicable portion of ARP04 to specify preservation of the following four historic resources: 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4) c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. The neighborhood commercial uses proposed for the NW Quadrant shall be constructed to provide a sufficient setback to allow these structures to visually 'read' as a working brickyard, with all original components of the brickmaking industry intact.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure R4.12-6: The County Department of Public Works will be responsible for reviewing and approving revisions to ARP04 prior to project approval.

Level of Significance after Mitigation

Mitigation Measure R4.12-6a and R4.12-6b, are adequate to reduce this impact to less than significant levels.

Impact R4.12-7: Other reclamation grading activities could impact additional Historic Resources (Less than Significant).

No other impacts to historic resources are anticipated in reclamation grading phases 1 - 4 of ARP04. Although substantial reclamation activities are proposed in the SE and NE Quadrants of the project site, no historic resources were identified in these areas that could be affected by the proposed project. Future land uses identified in the reclamation plan (Figure 3-6, Future Land Uses), identifies a new north-south road to be constructed between Marsh 2 and the Grassy Knoll (where the NE and NW Quadrants abut one another). The proposed road is in the general location of the former McNear's Dairy structures. Construction of this road would likely require demolition of these former dairy structures. As described in the *Setting* discussion, above, these structures do not have sufficient integrity to convey their earlier associations with the McNear dairy operations due to their highly dilapidated condition, and general lack of architectural significance. As such, these structures do not appear to meet the criteria for listing in the NRHP or CRHR, and their removal for road construction would have no significant impact to historic resources.

Mitigation: None required.

Impact R4.12-8: Proposed reclamation activities could have adverse impacts on adjacent, off-site historic resources (Less than Significant).

Reclamation activities would have no direct or indirect impacts to historic resources in the immediate vicinity of the project site, including the 1906 Erskine B. McNear house at 121 Knight Drive, or China Camp at 247 North San Pedro Road, due to the distance between the reclamation activities and the resources. Similarly, the proposed project would have no direct or indirect effects on potentially historic structures at McNear's Beach County Park, including the c.1880s wood frame barn, once belonging to George P. McNear.

Mitigation: None required.

Impacts of the Amended Surface Mining and Quarrying Permit

Impact P4.12-9: Continued quarrying at the project site could adversely affect prehistoric or unique archaeological resources, including those previously unidentified (Significant).

The proposal to continue quarrying operations does not appear to have the potential to affect adversely any known archaeological resources. However, unexpected discoveries are plausible given the previously identified resources in the area and the physical action of excavating sediments and rock at substantial depths. Such a discovery has the potential to cause a significant impact.

Mitigation Measures Proposed as Part of the Project

None.

Mitigation Measures Identified in this Report

Mitigation Measure P4.12-9: In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Agency Director.

Mitigation Monitoring and Reporting

Draft Mitigation Monitoring Measure P4.12-9: In the event of discovery, the Marin County Community Development Agency staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, the Marin County CDA staff shall verify that a registered archaeologist has been retained to assess the site and had submitted a written evaluation to the Agency Director advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, the CDA staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.

Level of Significance after Mitigation

Mitigation Measure P4.12-9 will reduce this impact to less than significant.

Impact P4.12-10: Continued quarrying at the project site may have a potential adverse effect on paleontological resources (Less than Significant)

Point San Pedro is primarily underlain by sandstone and shale of the Franciscan Assemblage. The sandstone at the site has been identified as a graywacke sandstone that is relatively intact by comparison to other exposures of Franciscan rocks. While these types of sediments have the potential for harboring paleontologic resources that would qualify as significant—in terms of scientific importance—for the purposes of CEQA (CEQA Guidelines 15064.5[a][3]), the considerable rock removal that has occurred at the Quarry site has not revealed any significant fossil deposits to date. A review of the University of California Museum of Paleontology localities for Marin County indicates that deposits of invertebrates have been identified near Point San Pedro; however, no specimens are on record at the museum.

Although Excavation and reclamation activities can have a deleterious effect on such resources if present, there is no evidence to suggest that such resources are present at the project site, and the impact is therefore considered less than significant.

Mitigation: None required.

Cumulative Impacts of the Amended Surface Mining and Quarrying Permit and Amended Reclamation Plan Combined

The foregoing discussion identifies several potentially significant impacts of the ARP and AQP on cultural resources. However, each of these impacts can be mitigated to less-than-significant levels with the incorporation of specified mitigation measures.

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CHAPTER 5

Growth-Inducing and Cumulative Effects

This chapter examines the potential for the Amended Reclamation Plan (ARP) and Amended Surface Mining and Quarrying Permit (AQP) projects to have growth-inducing effects, and to combine with other past, present, and reasonably foreseeable future projects to produce cumulative effects.

5.1 Growth-Inducing Effects

The California Environmental Quality Act Guidelines (CEQA *Guidelines*) §15126.2[d] require that an EIR evaluate the growth inducing impacts of a proposed action. A growth-inducing impact is defined by the CEQA *Guidelines* as:

The way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project, for example, involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a public service that otherwise limits growth.

The CEQA *Guidelines* further explain that the environmental effects of induced growth may be indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area

affected, would exceed available services, or otherwise result in an identifiable secondary impact as discussed above. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service and solid waste service. A project that would induce “disorderly” growth (conflict with the local land use plans) could indirectly cause additional adverse environmental impacts and other public services impacts. Thus, to assess whether a growth-inducing project will result in adverse secondary effects, it is important to assess the degree to which the growth accommodated by a project would or would not be consistent with applicable land use plans.

Components of Growth

The timing, magnitude, and location of land development and population growth in a community or region is based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and non-residential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type and intensity of growth, it is the primary means of regulating development and growth in California.

Growth-Inducement Potential of the Projects

As described in Chapter 3, Project Description, San Rafael Rock Quarry (SRRQ) provides aggregate building materials for Marin County and, especially through barge shipments, for other areas of the Bay and Delta region. The site is designated a Significant Mineral Resource Area and is one of a dwindling number of quarries in the area supplying essential aggregate material for a variety of construction uses, including road building and paving, concrete, and riprap for shoreline and levee revetment. Project approval would enable SRRQ to continue to produce aggregate through approximately 2024, when the final reclamation grades would be reached. Thereafter, unless the reclamation plan is subsequently amended again, reclamation of the site would be completed and the land would be developed consistent with current City of San Rafael and County of Marin land use designations.

Two aspects of growth inducement may be inferred from the projects. The first is that the continued supply of aggregate from the Quarry will contribute to the ability to undertake construction projects throughout the region. This may be seen as removal of a barrier to development; however, it may more accurately be regarded as enabling development for which pressures are exerted from other quarters: the availability of aggregate does not so much induce growth as to enable growth, as well as the continued functioning of our civilization, which is literally built on rock. In general, the amount of growth that can occur is governed by each jurisdiction’s general plan and other land use plans, policies, and ordinances. The pace of growth is determined by many factors, including the overall growth of the economy.

Because SRRQ has a deep water barge dock, it is able to supply riprap material for revetment of levees in the Sacramento-San Joaquin River Delta; in recent years SRRQ has had contracts to

supply rock for this purpose under a State of Emergency declared by the Governor. There are few active hard rock quarries in the Bay Area, and fewer that have ready access to a deep water dock. Increasingly, aggregate materials are being shipped into the area, from as far away as British Columbia, Canada.

The second potential growth inducing effect of the projects is with regards to development of the site itself following cessation of mining and completion of planned reclamation. The development of the site as envisioned in ARP04 is essentially identical to the planned post-reclamation use of the site that has been in place since 1976, and which is explicitly described in the current amended reclamation plan (ARP82). Since the area around the project site is already built-out or protected as open space, development of the quarry site would not be expected to trigger new development in the vicinity. Furthermore, through the review of the final Development, due to be submitted three years prior to the expected cessation of mining, Marin County and the City of San Rafael can be expected to guide site development such that it is consistent with then-existing and planned infrastructural capacity (including the capacity of Point San Pedro Road). Therefore, post-reclamation development of the site is not expected to induce additional growth.

5.2 Cumulative Impacts

“Cumulative impacts” refers to two or more individual effects that, when considered together, are considerable or compound other environmental impacts.¹ CEQA *Guidelines* require that EIRs discuss the cumulative impacts of a project when the project’s incremental effects are “cumulatively considerable,” meaning that the project’s incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. The discussion of cumulative impacts must reflect the severity of the impacts and their likelihood of occurrence, but need not provide as much detail as the discussion provided for impacts of the project alone, and should be guided by the standards of practicality and reasonableness.²

In addition, the CEQA *Guidelines* identifies that the following three elements are necessary for an adequate cumulative analysis:³

- A list of past, present, and reasonably anticipated future projects producing related or cumulative impacts, including those projects outside the control of the agency (list approach), or a summary of projections contained in an adopted general plan or related planning document which is designed to evaluate regional or area-wide conditions. Any such planning document is to be referenced and made available to the public at a location specified by the Lead Agency (plan approach);⁴

¹ CEQA *Guidelines* §15355

² CEQA *Guidelines* §15130(b)

³ *Ibid*

⁴ A recent appeals court decision (*Communities For A Better Environment v. California Resources Agency*, Case No. C038844 [10/28/02]) held that in determining probable future projects, lead agencies should not limit consideration to only one category of projects enumerated in CEQA *Guidelines* §15130(b)(1)(B)2 (such as those projects requiring agency approval for which an application has been received; projects included in an adopted capital improvements program, general plan, regional transportation plan, or other similar plan; projects anticipated as a later phase of a previously approved project; or those public agency projects for which money has been budgeted).

- A summary of expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project.

The cumulative analysis in this EIR uses projections from both the 2007 Countywide Plan Update and City of San Rafael General Plan 2020, as well as consideration of impacts associated with specific past, current, and proposed future developments in the surrounding unincorporated area and in the City of San Rafael.

Marin Countywide Plan

The 2007 Marin Countywide Plan Update (CWP 2007) (the General Plan; adopted November, 2007) provides for the long-range direction and development of land within the County. In November, 2007, the Board of Supervisors adopted the Marin Countywide Plan Update. The Countywide Plan Update is the principal governing general plan for unincorporated areas of the County; it establishes goals, policies, and programs that govern existing and future land uses and development in unincorporated areas. The following discussion identifies areas of potential impacts of the CWP, as identified in the Final EIR for the CWP (Marin County, 2007), which may, when combined with the impacts of the SRRQ projects, result in a cumulative impact. The following impact statements and numbers are taken verbatim from the Final EIR for the CWP.

Transportation Impact 4.2-21: San Rafael Rock Quarry

Development at the San Rafael Rock Quarry consistent with the CWP 2007 would result in significant cumulative intersection impacts.

Hydrology, Water Quality and Flood Hazards Impact 4.5-1: Water Quality Standards

Land uses and development consistent with the CWP 2007 would introduce additional pollutants to downstream waters. Such pollutants would result in adverse changes to the water quality of Marin County's natural and artificial drainageways and ultimately to Richardson, San Francisco, and San Pablo Bays.

Biological Resources Impact 4.6-1: Special-Status Species

Land uses and development consistent with CWP 2007 could result in loss of populations or essential habitat for special-status species

Biological Resources Impact 4.6-2: Sensitive Natural Communities

Development and land use activities consistent with CWP 2007 could result in loss of sensitive natural communities.

Biological Resources Impact 4.6-3: Wetlands and Other Waters

Development and land use activities consistent with CWP 2007 could result in direct or indirect impacts to wetlands and jurisdictional other waters.

Visual Resources Impact 4.12-4 Light Pollution and Nighttime Sky

Land uses and development consistent with the CWP 2007 would create additional sources of lighting resulting in sky glow, light trespass, and glare.

Peacock Gap Neighborhood Plan

In 1980 the City of San Rafael adopted a neighborhood plan for the Peacock Gap Neighborhood, including the Quarry site. This plan was adopted the following year by the Marin County Board of Supervisors with two exceptions: (1) development densities and (2) provisions for residential screening at a parcel adjacent to SRRQ. In 2004, however, the City adopted a new General Plan, which includes a Neighborhoods Element, and rescinded the 1980 Peacock Gap Neighborhood Plan (Resolution 11665). The Neighborhoods Element supersedes the 1980 Peacock Gap Neighborhood Plan and the other neighborhood plans that had been adopted around the same time. The County has not taken formal action on the new San Rafael General Plan or Neighborhoods Element comparable to its action on the earlier Neighborhood Plan. The following policies from the Marin Countywide Plan Update reference the Peacock Gap neighborhood plan.

Community Development-1.2. Direct Urban Services

Discourage extension of urban levels of service to serve new development beyond urban service areas.

Community Development-6.1. Coordinate Urban Fringe Planning

Seek city review of development proposed adjacent to urban areas. Discourage development requiring urban levels of service from locating outside urban service areas. Coordinate with cities and towns regarding their plans and rules for annexing urbanized areas.

San Rafael General Plan 2020

The San Rafael General Plan 2020 examines the community's future growth and development and the elements that impact land use decisions. These elements include Land Use, Transportation, Open Space, Conservation, Housing, Noise, Safety, Air and Water Quality, Community Design, Culture and the Arts, Economic Vitality, Governance, Infrastructure, Neighborhoods, and Parks and Recreation. This plan has been examined in an EIR (City of San Rafael, August 2004) for the potential effects that may result when this plan is implemented. Impacts which may combine with impacts of the ARP and AQP to result in cumulative impacts include the following (impact statements and numbers are taken verbatim from the San Rafael General Plan 2020 Final EIR):

Aesthetics/Visual Resources Impact IV.7-4: Nighttime Lighting and Glare

Development consistent with the Draft General Plan 2020 could create new sources of light or glare and increase nighttime lighting in the area resulting in a significant impact.

Biological Resources Impact IV. 8-1: Special-Status Plant and Animal Species

Implementation of the Draft General Plan 2020 could affect a number of federally or state

listed plant and animal species directly through incidental take or indirectly through habitat destruction resulting in a significant impact. Sensitive natural communities would be affected by implementation of the General Plan resulting in a significant impact.

Geology, Soils and Seismicity Impact IV.9-5: Erosion

There is potential for the loss of soil resources due to erosion as well as the potential for the exposure of improvements to erosion-related damage resulting in a significant impact.

The Village of Loch Lomond Marina

The proposed Project site is located in the Loch Lomond neighborhood in the eastern portion of the City of San Rafael and proposes a two-phased development of the Loch Lomond Marina with mixed-use that includes restoration of the existing marina, conservation of major wetlands, neighborhood commercial uses, office space, mixed residential units, and recreation uses. The EIR has assessed the environmental impacts for the proposed Village of Loch Lomond Marina Project in January 2007. The following impacts were identified in the Village of Loch Lomond Marina EIR as potentially resulting in a cumulative impact when combined with the SRRQ EIR impacts.

Noise Impact 3.6-1:

Grading and construction associated with implementation of the proposed Project would result in temporary noise and/or vibration impacts on nearby noise-sensitive receptors. Less than significant with mitigation.

Biological Resources Impact 3.7-1:

Implementation of the proposed Project may disturb the nesting of special-status bird species and other breeding birds. Less than significant impact with mitigation.

Biological Resources Impact 3.7-3:

Implementation of the proposed Project would potentially disturb migratory fish. Less than significant with mitigation.

Biological Resources Impact 3.7-9:

The proposed Project would result in the loss of Federally protected non-tidal wetlands (as defined by Section 404 of the Clean Water Act) through direct filling. Less than significant with mitigation.

Biological Resources Impact 3.7-11:

Construction and operational activities associated with the proposed Project could degrade water quality in adjacent surface waters and/or wetlands. Less than significant with mitigation.

Biological Resources Impact 3.7-12:

Implementation of the proposed Project could result in potentially adverse impacts on mature native oak trees and mature ornamental trees. Less than significant with mitigation.

Dutra Haystack Landing Asphalt & Recycling Facility

This proposed project would construct and operate an asphalt batch plant, an asphalt and concrete recycling facility, and an aggregate materials off-loading, storage and distribution facility for Dutra Materials. The Draft EIR for this project was published in January 2008 and the following impacts were identified as having potential cumulative effects when combined with the San Rafael Rock Quarry Amended Quarry Permit DEIR impacts (impact statements and numbers are taken verbatim from the Draft EIR).

Air Quality Impact-1

Project construction would result in emissions of criteria pollutants.

Air Quality Impact-6

Conflict with or obstruct implementation of an applicable air quality plan.

Traffic Impact-7

Near-term cumulative queuing impacts.

Traffic Impact-13b

Access for neighboring residential land uses.

Projects Potentially Having Related or Cumulative Effects

Table 5-1 lists the projects that were considered in the evaluation of cumulative impacts. The sources for this list include information provided by the Marin County Community Development Department's PropDev list from October 2006 for recent planning projects. In addition to the development projects within the vicinity of the SRRQ that may have cumulative effects, the table includes projects within the vicinity of the SRRQ that do not have the potential for cumulative effects. The Trinity Community Church, Ascoma Place, Chapel Cove, and San Pedro Court development projects have impacts that are localized and are not considered to have the potential to combine with the project to create cumulative effects due to the location, size or nature of the projects listed.

In addition to off-site projects, previously permitted projects at the project site include the 1972 Surface Mining and Quarrying Permit and the 1982 Amended Reclamation Plan, which together have enabled the continuation of mining activities on the site until the present time. In addition, development of the Peacock Gap neighborhood over the past approximately 50 years, and the construction of Point San Pedro Road as a major thoroughfare connecting the neighborhood (as well as the quarry) to downtown San Rafael and access to U.S. 101, had profound effects on land use, biological resources, the ambient noise environment, growth inducement in the area, and the demand for public utilities and services. Along with the approval of ARP82, growth of the residential neighborhood set in motion the predictable conflict between land uses described in Section 4.6, Land Use and Planning.

**TABLE 5-1
DEVELOPMENT PROJECTS AND PLANS IN THE VICINITY OF OR OTHERWISE RELATED TO
SAN RAFAEL ROCK QUARRY**

Project Name	Planning Jurisdiction	Location/Project Characteristics	Status
Plans and Projects That May Have Cumulative Effects			
The Village at Loch Lomond Marina	City of San Rafael	Phase I: Commercial development of retail/office commercial building; residential development of 68-unit single-family homes. Phase II: potential 16-unit single-family homes; 110 Loch Lomond Drive, San Rafael	Final EIR certified January, 2007
Dutra Haystack Landing Asphalt & Recycling Facility	Sonoma County	Construction and operation of an asphalt batch plan, an asphalt and concrete recycling facility, and an aggregate materials off-loading, storage and distribution facility at 3355 Petaluma Blvd. South.	Draft EIR published January, 2008
Planning Documents			
City of San Rafael General Plan 2020	City of San Rafael	General Plan for the City of San Rafael	Adopted 2007
Marin Countywide Plan	Marin County	General Plan for unincorporated area of Marin County	Adopted 2007
Projects Not having the Potential for Cumulative Effects			
Trinity Community Church	City of San Rafael	Subdivision into 6 new residential lots; 1675 Grand Ave., San Rafael	Under construction
Ascoma Place	City of San Rafael	10 lot single family subdivision; Pt. San Pedro Road, San Rafael	Project approved
Chapel Cove	City of San Rafael	15 unit single-family residential subdivision; 1115 Pt. San Pedro Road, San Rafael	Construction complete
San Pedro Court	Marin County, Santa Venetia	12 single family residences; 650 North San Pedro Road, Santa Venetia	Under review

Impact Discussion: Cumulative Impacts

Possible cumulative impacts that may result from approval of the project, combined with the development of other approved or reasonably foreseeable projects in the area are discussed below. In each topical impact section within Chapter 4 in which there are potentially significant impacts of both the ARP and AQP, the impact discussion includes consideration of impacts from the two projects combined.

Aesthetics

Impact C5-1: The potential for the Amended Surface Mining and Quarrying Permit to produce new sources of light and glare could combine with similar effects associated with the development of the Village at Loch Lomond Harbor, as well as past development of the Peacock Gap Neighborhood, to create a cumulative effect (Less than Significant).

Impact P4.1-9 in Section 4.1, Aesthetics, describes a potentially significant impact of the project associated with light and glare from proposed nighttime operations. This impact can, however, be reduced to less than significant with incorporation of specified mitigation measures (see particularly Mitigation Measure 4.6-6b in Section 4.6, Land Use and Planning. The residual impact would be so slight that its contribution to a degradation of regional visual resources would not be cumulatively considerable.

Mitigation: None required.

Impact C5-2: Continued mining operations enabled under ARP04, in conjunction with planned phased reclamation in the ARP04, may contribute to a change in visual quality in the Point San Pedro area (Less than Significant).

The Point San Pedro area had already been altered substantially by the 1940s with the development in the 19th Century of agricultural and industrial uses, and was to be even more profoundly changed in the following decades with the development of the Peacock Gap neighborhood (See Figure 3.3 in Chapter 3, Project Description). In the past half century, the area has been transformed from open space, agricultural, and industrial land uses to a predominantly residential area flanked by a green belt. The change in the visual character of the area over the past 60 years -- and well before that -- may be considered both significant and irreversible. Continued operation of the quarry under the AQP, along with planned phased reclamation grading and post-reclamation development of the site, will further alter the visual character of the area, as described in Section 4.1, Aesthetics. The contribution to the overall change in the area, especially in light of the relatively small or benign differences between proposed site uses and those embodied in current permits, is considered less than cumulatively considerable, and therefore less than significant.

Mitigation: None required.

Air Quality

Impact C5-3: The project would add incrementally to cumulative air pollutant emissions (Significant).

As indicated in Section 4.2, Air Quality, Impact R4.2-1 and R4.2-2, reclamation grading associated with the ARP would be expected to result in emissions of criteria air pollutants in excess of Bay Area Air Quality Management District (BAAQMD) thresholds for determining significance. Projects exceeding the BAAQMD significance thresholds are generally considered to be inconsistent with the *Bay Area 2005 Ozone Strategy* and are thus considered to contribute substantially to a cumulative regional impact. Implementation of mitigation measures specified in Section 4.2, Air Quality (Mitigation Measures R4.2-1a h through j and R4.2-2a and b), however, would reduce ~~the severity of the these impacts, but it would remain~~ to less than significant. ~~Consequently, when impacts from reclamation grading are added to the cumulative impacts of other sources of air pollution throughout the Bay Area air basin, the total emissions will remain well above the BAAQMD recommended significance thresholds and inhibit regional attempts to achieve attainment of air quality standards. The cumulative aspect of the impact is considered significant is an unavoidable consequence of project approval.~~

Mitigation: ~~No other mitigation measures (beyond~~ Implement Mitigation Measures R4.2-1a through j h) ~~are identified.~~ and R4.2-2a and b.

Level of Significance After Mitigation:

~~Significant and Unavoidable.~~ Because Mitigation Measures R4.2-1 and R4.2-2 would reduce the corresponding impacts to less than significant, the contribution of the residual impacts would not be considered cumulatively considerable; therefore, the cumulative impact is reduced to less than significant as well.

Impact C5-4: Greenhouse Gas Emissions of the Amended Reclamation Plan and Amended Surface Mining and Quarrying Permit would add to global greenhouse gas emissions and contribute to global climate change (Less than Significant).

The expected emissions of greenhouse gases (GHGs) from the ARP and AQP are discussed in Section 4.2, Air Quality. As discussed in that section, with incorporation of the specified mitigation measures emissions can be reduced to 1990 levels and would therefore be considered less than significant. The nature of global climate change due to GHG emissions is inherently cumulative, therefore the reduction of the projects' GHG emissions below significance thresholds can also be deemed sufficient to reduce the contribution to the cumulative, global impact to less than significant.

Mitigation: None required.

Biological Resources

Impact C5-5: Implementation of the proposed Amended Surface Mining and Quarrying Permit and proposed Amended Reclamation Plan together, and, in combination with other past, present, and reasonably foreseeable future projects, could result in significant cumulative impacts on the biological resources of the Point San Pedro Area (Less than Significant).

The geographic context for analysis of cumulative impacts to biological resources includes the greater Point San Pedro area (from Highway 580 east to Point San Pedro). These lands represent a continuum from relatively undisturbed wildlands to the wildland-urban interface to industrial land uses. This analysis evaluates whether the impacts of the proposed AQP and ARP, together with the impacts of other cumulative development, would result in a significant impact and, if so, whether the incremental contribution of the proposed AQP and ARP to this impact would be considerable. Both conditions must apply in order for the project's cumulative impacts to rise to the level of significance.

The biological environment of the San Francisco Bay Area has changed considerably over the past 150 years, as the human population has grown and land uses have changed from being dominated by agricultural practices to being dominated by urban and industrial uses. As noted above, major changes in the natural environment in the vicinity of SRRQ began over 100 years ago with the establishment of quarrying and brick-making there and the cutting off of tidal marshes with the construction of a causeway by 1899. The cumulative effects of wetland fill and home construction in the Point San Pedro area combined with the industrial uses at the Quarry have resulted in a degradation of habitat throughout the southern portion of Point San Pedro, thereby reducing plant and wildlife diversity in this area and undoubtedly leading to the loss of a number of species that once occurred there. This is considered a cumulatively significant impact. However, most of these adverse effects have already occurred—native coastal prairie has already been converted to non-native annual grassland and ruderal habitat and the species of birds and other animals still using the remaining open space at SRRQ are primarily those that are disturbance-tolerant and are therefore relatively common.

As noted above, all potential impacts on biological resources resulting from continued Quarry operations, as well as the proposed phased reclamation plan, can be mitigated to less-than-significant levels. Implementation of the proposed AQP is to occur within an area that is already severely degraded and implementation of the proposed ARP will preserve the most sensitive habitat occurring at SRRQ. In addition, the implementation of mitigation measures associated with the projects would be aimed at restoring tidal influence to the Quarry marshes, which should ultimately result in improvement of habitat quality there. Therefore, with respect to the impacts identified in this EIR, the combination of the biological impacts of the two projects together is not expected to be cumulatively considerable; nor is the contribution of the two projects to ongoing cumulative impacts on biological resources in the vicinity of the project site expected to be cumulatively considerable.

Mitigation: None required.

Geology, Soils and Seismicity

Potential impacts of the ARP related to geology, soils, seismicity, and groundwater are site-specific and would not combine with related impacts of other projects to create cumulatively considerable impacts.

Post-reclamation development of the site, which is presented in ARP04 only at a conceptual level, includes new residential, commercial, and marina uses. While the number of people visiting, living, and working in the area would increase as a result, exposing additional people to seismic and geological hazards, the risk to people and property would be reduced through the construction of buildings according to the most current version of the California Building Code. While future seismic events cannot be predicted, adherence to all federal, state, and local programs, requirements and policies pertaining to building safety and construction would limit the potential for injury or damage. Therefore, the project, combined with other foreseeable development in the area, would not result in a cumulatively significant impact by exposing people or structures to risk related to geologic hazards, soils, and/or seismic conditions.

Hydrology and Water Quality

Potential impacts of the ARP related to hydrology and water quality can be mitigated to less than significant. Because the residual effect would not significantly degrade water quality or adversely affect the hydrology of the project site and surroundings, it would not make considerable contribution to any cumulative impact on these resources.

Land Use and Planning

See Section 4.6, Land Use and Planning, for a discussion of cumulative impacts of this kind.

Noise

The major noise sources in the Point San Pedro area are SRRQ and Point San Pedro Road. Noise impacts of the AQP and ARP can be mitigated to less than significant, with the exception of Impact R4.7-1and (Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations). This impact would, however, be of limited duration and therefore would not contribute to any general increase in ambient noise level in the area. Several other aspects of quarry operations and reclamation grading would result in less-than-significant increases in noise levels. These residual impacts, along with blasting-related vibration, would, however, contribute to a significant and unavoidable, cumulative land use compatibility impact (Impact C4.6-7) identified in Section 4.6, Land Use and Planning.

Hazardous Materials

Section 4.8, Hazardous Materials, identifies potentially significant effects of both the ARP and AQP associated with transport, storage, and use of hazardous substances. With the specified mitigation measures, however, the residual impact would be so slight that it would not make a considerable contribution to any cumulative impact involving hazardous materials.

Public Services, Utilities, and Energy

Neither the AQP nor the ARP was found to have the potential for a significant effect on public services, utility, or energy consumption. The effects would be so slight that they would not make a considerable contribution to any regional cumulative impact.

Transportation and Traffic

See Impact C4.10-3 in Section 4.10, Transportation and Traffic.

Population and Housing

Neither the ARP nor the AQP was found to have the potential for an adverse effect on population and housing. There would therefore be no contribution to regional cumulative effect of this kind.

Cultural Resources

Section 4.12, Cultural Resources, identifies several potentially significant impacts of both the AQP and ARP on cultural resources. With the specified mitigation measures, however, known and any currently undiscovered resources would be adequately protected, precluding the possibility of a contribution to a regional cumulative impact.

References – Growth-Inducing Effects

BAAQMD, *Bay Area 2005 Ozone Strategy*, September, 2005a.

City of San Rafael, *San Rafael General Plan 2020 Draft EIR*, August 2004.

Marin County, *PROPDEV 36, Semi-Annual Proposed Development Survey: An Inventory of Proposed Development Projects in Marin County as of October, 2006*. Marin County Community Development Agency in cooperation with the Planning Departments of the Cities and Towns of Marin, 2006.

Marin County, *Marin Countywide Plan Update Final Environmental Impact Report*. November 2007.

CHAPTER 6

Alternatives to the Projects

The California Environmental Quality Act (CEQA) requires an evaluation of the comparative effects of a range of reasonable alternatives to a project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project (CEQA *Guidelines* §15126.6[a]). The EIR is to consider a reasonable range of potentially feasible alternatives that will foster informed decisionmaking and public participation. The nature and scope of the alternatives to be discussed is governed by the “rule of reason.” The discussion of alternatives is to focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede, to some degree, the attainment of the project objectives, or would be more costly (CEQA *Guidelines* §15126.6[b]).

The range of potential alternatives shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the project’s significant adverse effects. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency’s determination (CEQA *Guidelines* §15126.6[c]). The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project (CEQA *Guidelines* §15126.6[d]). CEQA requires evaluation of a No Project Alternative is required, to allow decisionmakers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The “No Project” analysis shall discuss existing conditions at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved (CEQA *Guidelines* §15126.6[e]).

This Chapter considers alternatives to the Amended Reclamation Plan (ARP) and the Amended Surface Mining and Quarrying Permit (AQP) separately. For each of the two projects, an initial “long list” of alternatives is presented, from which several are selected because they meet CEQA requirements for the alternatives analysis. That analysis includes a comparison of the likely adverse impacts of each alternative with those of the project as proposed; an evaluation of the ability of each alternative to meet project objectives; and a conclusion regarding which alternative should be considered “environmentally superior.”

6.1 Alternatives to the Amended Reclamation Plan

This EIR considers six alternatives to the ARP, three of which are selected for further analysis because of their feasibility, their ability to meet most of the basic objectives of the project, and because they provide a reasonable range of alternatives to the project. The three alternatives selected for analysis are:

- No Project/Status Quo Alternative
- Mitigated Alternative
- Alternative Reclamation with Alternative Beneficial End Use

The three rejected alternatives are:

- Off-site Alternative
- Reclamation by way of Landfill
- Open Space Alternative

Below, each of these three alternatives is described and its potential environmental impacts and ability to meet basic project objectives are compared with the proposed project.

Amended Reclamation Plan Alternatives Considered but Rejected

In addition to the three alternatives selected for this analysis, the Lead Agency considered several other possible alternatives. Upon consideration, however, these alternatives were rejected because of one of three reasons: the alternative failed to meet most of the basic project objectives; the alternative was found to be infeasible; or the alternative did not have the ability to avoid the significant environmental impacts identified for the project. These rejected alternatives are discussed briefly, along with the specific reason that they were rejected.

Off-Site Alternative

The off-site alternative is rejected because another site would have to meet the requirements of availability of mineral resource, appropriate land use designation, and availability of a barge dock. The project site is a designated significant mineral resource area. No other vacant parcels meeting these criteria are known to exist in the central Bay Area.

Reclamation by Way of Landfill Alternative

This alternative would have as its primary goal the eventual filling of the Main Quarry Bowl through backfilling, rather than flooding. After the completion of mining in the Main Quarry Bowl, it would undergo permitting as a class III (non-hazardous) solid waste landfill. The Main Quarry Bowl would be backfilled with solid waste, which could be brought to the site by truck or barge. This would provide solid waste disposal capacity for Marin County and the region for many years.

This alternative is rejected because it is likely that it would cause substantial additional significant effects, including air quality impacts and conflicts with adopted land use plans that would not be experienced by the project, and has only limited ability to reduce or eliminate significant effects of the project.

Open Space Alternative

Instead of developing the site after reclamation as mixed residential, commercial, and marina uses, this alternative would establish open space and recreation as the post-reclamation uses. This would include restoration and protection of sensitive habitat areas, and establishment of areas suitable for recreational use. Recreation-oriented development, perhaps including a marina with minimal commercial development, would be established around the flooded quarry bowl. Historic buildings around McNear's Brickyard would be retained for use as interpretive centers, meeting rooms, a conference center, etc. This would require a re-thinking of reclamation grading; for example, the surcharge berm in the NW Quadrant would not be necessary, and much of the final grading would be to achieve natural looking slopes, rather than development planes.

This alternative is rejected because it does not appear capable of reducing or eliminating the significant effects of the project, most of which are associated with reclamation activities, not with post-reclamation use of the site; and because it fails to meet project objectives for post-reclamation use. Aspects of this alternative are incorporated into the Alternative Reclamation with Alternative Beneficial End Use Alternative.

6.2 Analysis of Alternatives to the Amended Reclamation Plan

Each alternative selected for analysis is described below. The impacts associated with each alternative are compared to the project's impacts in Table 6-1. The ability of each alternative to meet project objectives is presented in Table 6-2.

No Project/Status Quo Alternative

Alternative Description

The required No Project Alternative must examine the existing conditions and reasonably foreseeable future conditions that would exist if the project were not approved (CEQA *Guidelines* §15126.6(e)). This Alternative assumes no action would be taken for approval of the Amended Reclamation Plan (ARP04) as currently proposed. This would require SRRQ to revert to the provisions of the adopted 1982 Amended Reclamation Plan (ARP82), which to the extent applicable would remain in effect for reclamation of the site. This would include ARP82's limitations on the depth, lateral extent and duration of mining of the Main Quarry Bowl, and for the final contours of South Hill. It would also delay all reclamation of the site until the cessation of quarrying. Post-reclamation use of the site would differ little from the project as proposed.

Because the extent of quarrying currently exceeds the final grades established for the site under ARP82, SRRQ would remain out of compliance with SMARA in terms of its approved Reclamation Plan. Some additional quarrying of South Hill could be undertaken in a manner that could still allow for compliance with the final contours approved in ARP82. This alternative would result in violation of SMARA and likely trigger one of two future actions: an enforcement action with potential imposition of financial sanctions and referral to OMR for possible action; and/or the necessity for SRRQ to compose a new amended reclamation plan that would at a minimum require reclamation of the Main Quarry Bowl as currently configured and reclamation of South Hill to achieve the final contours identified in ARP82, based on depletion of the resource at current production levels for mining of this area. Under this enforcement/compliance scenario, SRRQ would be required to begin preparation of detailed plans for cessation of quarrying operations, final site reclamation, and post-reclamation development, at the present time or three years prior to the estimated cessation of quarrying. It should be noted that, as discussed in Chapter 3, Project Description, the Marin County Superior Court found that the Quarry has a vested right to continue to mine within the current mining footprint without restrictions on depth or duration.

Effect on Operations

This alternative would result in the cessation of operations much sooner than anticipated in ARP04.

Mitigated Alternative

Alternative Description

The Mitigated Alternative would include all mitigation measures identified in the EIR, would eliminate or alter those aspects of the proposed Reclamation Plan that have the greatest likelihood of causing significant impacts, and would include other, beneficial project components not contained in the applicant's proposal. This would include the following:

The ~~NE~~~~orth~~~~east~~ Quadrant would not be used as a staging area for storage and processing of materials for phased reclamation grading. Instead, areas of the ~~NE~~~~orth~~~~east~~ Quadrant that are to be left in a natural condition, including the Grassy Knoll and the eucalyptus grove, would in the first phase of reclamation be restored to their final condition. Other areas of the NE Quadrant would be left in their current condition or re-graded to rough final grades, re-soiled, and re-vegetated appropriately to allow for eventual development after cessation of quarrying activities. Stockpiled material would either be left in place or moved to the NW Quadrant for use in constructing the surcharge berm if needed for that purpose. The existing berm in the NE Quadrant would be left in place until the cessation of quarrying.

In the SE Quadrant, SRRQ would continue mining the Main Quarry Bowl until final depth and extent are reached, prior to mining elsewhere on the property, including South Hill. The Main Quarry Bowl would then be used for depositing any excess overburden, pond fines, or other mining wastes from other areas of the property. Materials would be tested to ensure they did not

exceed hazardous materials standards prior to placement. In addition, materials from off site, including dredge spoils, would be brought in, primarily by barge, and deposited in the Main Quarry Bowl to reduce the final depth to approximately 30 feet msl. The most likely material to be used for this purpose is dredge spoils. Recent projections indicate that between 1995 and 2045, some 400 million cubic yards of sediments will be dredged from San Francisco Bay, an annual average of eight million cubic yards (San Francisco Estuary Project, 2008). Dredge spoils could be pumped into the Main Quarry Bowl before it is connected to the Bay, to avoid water quality problems. Any materials placed in the Main Quarry Bowl would eventually be covered with a cap of clean material prior to flooding of the bowl. A mechanical mixing or aeration system would be installed to ensure adequate water quality in the flooded bowl to meet RWQCB water quality standards.

In the SW Quadrant, SRRQ would delay further mining of South Hill until mining is completed in the Main Quarry Bowl. Overburden from South Hill would then be temporarily stockpiled or used as backfill in the Main Quarry Bowl.

In the NW Quadrant, the marshes would be restored to their final reclamation condition during phase 1 of reclamation. This would include hydraulic reconnection of the marshes with one another and restoration of tidal circulation. A buffer consistent with current and future use of the NW Quadrant and BCDC regulations would be established around the marshes. Stockpiles and the surcharge berm would be configured to avoid damaging or destroying structures eligible for designation as cultural resources. Post-reclamation use of the NW Quadrant would retain and preserve all remaining structures that are eligible for designation as cultural resources and that are suitable for preservation or adaptive reuse.

For this Alternative, post-reclamation uses of the site would be the same as those in the proposed Reclamation Plan. To offset increased energy demand and emission of air pollutants, including greenhouse gasses, post-reclamation development of the site would, however, include measures consistent with the Countywide Plan Update for sustainability and reduced ecological footprint. These features would be incorporated into the proposed future marina, residential, and commercial end use development; including, if found to be feasible at that time, installation and operation of a tidal energy generator facility located in the vicinity of the jetties proposed to be constructed in conjunction with the opening of the Main Quarry Bowl to the Bay.

Effect on Operations

This alternative would affect ongoing quarrying operations, since mining of South Hill would be delayed until after the Main Quarry Bowl is mined. The earlier reclamation of natural areas and limitations on proposed phased reclamation grading activities may also affect the timing and location for management of Quarry's ability to manage mining wastes on the property. Filling of the Main Quarry Bowl with dredge spoils and other overburden and other materials to the extent required to avoid water quality impacts would prolong completion of final reclamation and require additional study for development of a comprehensive deposition plan that could avoid potential impacts resulting from odor from dredge spoils, air quality diesel particulate emissions, barge traffic and related effects of backfilling the Main Quarry Bowl.

Alternative Reclamation with Alternative Beneficial End Use

Alternative Description

The Alternative Reclamation with Alternative Beneficial End Use Alternative would examine significantly different reclamation resulting in substantially different beneficial end uses of the site. These would include action in the near term for protection and restoration of all areas designated as “leave in natural condition” in the applicant’s proposal, and in addition the following:

- The NE Quadrant would be used for open space and recreation, and incorporated into McNear’s Beach County Park;
- The NW Quadrant would feature broad buffers around the restored marshes. Approximately 15-20 acres would be developed as a resource interpretive conference center and/or educational facility.
- Under this Alternative, no breach of the Main Quarry Bowl would occur and an alternative beneficial end use would be developed. Instead of a marina with access to the Bay, the Main Quarry Bowl would not be connected to the Bay, and would not be flooded. ~~not be connected to the Bay, and would be filled with fresh water to become a water supply reservoir. This would be developed in conjunction with the Marin Municipal Water District. The area around the reservoir would be used for limited commercial and/or lower density residential development, consistent with protection of water quality within the reservoir. It is possible that non-body contact water recreation would be allowed within the reservoir, with the development of appropriate facilities (e.g., a boat launch).~~ Facilities for a solar array energy generator would be developed as an additional beneficial end use on the southern exposure of the Main Quarry Bowl benches, if deemed feasible at that time. ~~Optionally~~ The Main Bowl would remain unfilled and used for an alternate land use such as solar energy facilities, an amphitheater, recreational uses including rock climbing, or other suitable future end use. Rainwater can be expected to collect in the bottom of the bowl and form a pond, which might persist year-round. The pond could be used as a recreational or wildlife area.
- Final grades and reclamation grading, re-soiling, and re-vegetation would be consistent with these end uses, including re-soiling of benches and the base of the Main Quarry Bowl to enable the establishment of vegetation consistent with the end use, and maintenance of an access road to the bottom of the bowl. It would be necessary to specify an intended end-use for the Main Quarry Bowl with sufficient time prior to the cessation of mining such that, if necessary, the design of the final slopes of the bowl could be adjusted to ensure an adequate factor of safety for seismic and static stability.

Effect on Operations

Like the Mitigated Alternative, this Alternative may affect ongoing quarrying operations because of earlier reclamation of natural areas; final contours of mined areas may also differ.

Comparison of Amended Reclamation Plan Alternatives

The following discussion provides a brief comparison of the likely environmental impacts of the three alternatives with those of the project itself. Per CEQA *Guidelines* §15126.6(d), “The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.” Thus, the analysis of alternatives need not be as exhaustive as that of the project itself. The discussion below is divided by issue area, such as Air Quality and Biological Resources. For each issue area, a comparison is drawn between potential effects of the project and those of the alternatives. This comparison is summarized in Table 6-1.

Aesthetics

The project is not expected to have significant aesthetic effects: either changes between ARP04 and ARP82 will not be visible, or they will not have a demonstrable negative aesthetic effect. Likewise, the No Project/Status Quo Alternative would not be expected to change substantially views of the Quarry from surrounding public view points and homes, or to substantially alter the visual character of the site. The Mitigated Alternative would provide a slight improvement over the less-than-significant aesthetic effects of the project, mainly by preserving the historic structures in McNear's Brickyard, by restoring to final reclamation condition several natural areas that the project would delay restoring until the cessation of quarrying; and by not constructing the berm in the NE Quadrant, which would become superfluous as a visual and sound barrier, since reclamation activities slated for the NE Quadrant in the project would be substantially reduced under the Mitigated Alternative.

The Alternative Reclamation with Alternative Beneficial End Use Alternative would also potentially provide minor improvements to less-than-significant aesthetic effects of the project, including lower density development post-reclamation, and more areas devoted to open space.

Air Quality

The project is expected to have significant unavoidable air quality impacts, including ~~increased emissions of criteria air pollutants and~~ toxic air contaminants (TACs) that would exceed BAAQMD significance thresholds and pose a health risk to neighbors of SRRQ. The No Project/Status Quo Alternative would reduce the length of time required to reach final reclamation grades, ~~and would also~~ concentrate reclamation of the site into a shorter period of time, and would not involve reclamation grading simultaneous with mining. This would be particularly effective in reducing exposure of neighbors to TACs, and so would reduce health risks associated with the project. Emissions of criteria air pollutants would still be expected to exceed BAAQMD thresholds during the period of reclamation.

The Mitigated Alternative would similarly concentrate most reclamation at the end of quarrying and so would have similar benefits for air quality, compared to the project, as the No Project/Status Quo Alternative. ~~However, bringing materials to the site, presumably by barge, to backfill the Main Quarry Bowl would likely expose neighbors of SRRQ to relatively high concentrations of diesel emissions from tugboats.~~ The Mitigated Alternative also includes alternative energy production that would reduce the emission of greenhouse gasses associated with post-reclamation development.

The Alternative Reclamation with Alternative Beneficial End Use Alternative would result in lower density development following site reclamation. This aspect of this alternative represents a substantial improvement over the project itself, in terms of post-reclamation air quality impacts.

Biological Resources

While the project is expected to have several significant impacts on biological resources, all of these impacts can be mitigated to less than significant.

Both the Mitigated Alternative and the Alternative Reclamation with Alternative Beneficial End Use Alternative would restore immediately, rather than in the future, the areas of the project site that are to be left in a natural state. This would be a distinct advantage for biological resources. The Alternative Reclamation with Alternative Beneficial End Use Alternative would also establish broad buffer areas around the marshes and would specify post-reclamation end uses that would likely have less of an impact on marsh wildlife (particularly through reduction in residential uses, which would be associated with feral cats).

The No Project/Status Quo Alternative would be expected to have about the same impact as the project on biological resources, except that restoration of the natural areas would occur sooner, since quarrying would cease sooner. Also, ~~because the final depth of the Main Quarry Bowl would be shallower, there would be a smaller volume of~~ because this alternative does not include the aeration or mixing system to prevent deep water subject to stratification, poor water quality, and potential deleterious effects on aquatic organisms in the flooded Main Quarry Bowl, this alternative could be expected to result in significant biological impacts that would be mitigated or avoided under the Project and the other alternatives.

Geology, Soils, and Seismicity

The project itself would have the potential for significant environmental effects related to geology, soils, and seismicity, but these would be reduced to less-than-significant with the mitigation measures specified in Section 4.4. The No Project/Status Quo Alternative would be expected to have similar, but somewhat lesser impacts, since the final depth of the Main Quarry Bowl would be less than for the proposed project, and so would likely be more stable. ~~The Mitigated Alternative would include backfilling of the Main Quarry Bowl, which would also make the slopes of the flooded bowl more stable.~~ The Alternative Reclamation with Alternative Beneficial End Use Alternative would specify low-impact land uses ~~around a freshwater reservoir in the Main Quarry Bowl,~~ and so would likely result in lower levels of erosion and sedimentation.

Hydrology and Water Quality

The project is expected to have significant effects on hydrology and water quality related to the potential for contaminated stormwater runoff and stratification of water in the flooded Main Quarry Bowl following reclamation, but these effects can be mitigated to less-than-significant with the measures specified in Section 4.2-5. The Alternative Reclamation with Alternative Beneficial End Use Alternative specifies broader buffers around marsh areas and low-density development compatible ~~with a water supply reservoir around the Main Quarry Bowl,~~ both of which would reduce the potential for contaminated stormwater runoff to reach the marshes and the ~~flooded Main Quarry Bowl, which would remain dry.~~ Freshwater can, however, also stratify, resulting in poor water quality at depth; it is likely that this impact would remain the same for this alternative.

The No Project/Status Quo Alternative would not ~~substantially improve these impacts over the project itself, though a shallower final depth for the Main Quarry Bowl would result in a lower volume of water subject to the poor water quality conditions associated with stratification.~~ include

the aeration or mixing system to prevent stratification, poor water quality, and potential deleterious effects on aquatic organisms in the flooded Main Quarry Bowl, this alternative could be expected to result in significant water quality impacts that would be mitigated or avoided under the Project and the other alternatives.

The Mitigated Alternative would include the aeration or mixing system to prevent stratification of the water column and resulting degraded water quality. ~~backfill the Main Quarry Bowl, which would reduce to less than significant the stratification impact associated with the project. To avoid additional water quality impacts, the Main Quarry Bowl would be backfilled when it was dry. Materials used to backfill the bowl would either be not contaminated, or, if contaminated, would be capped with clean~~

~~material to prevent contaminants from entering the waters of the flooded bowl.~~ This alternative, like the Alternative Reclamation with Alternative Beneficial End Use Alternative, would restore tidal action in the marshes, resulting in restoration of more natural hydrology, a benefit delayed until the cessation of quarrying by the project itself.

Land Use and Planning

There are several significant land use and planning impacts associated with the ARP project, ~~but these can all~~ most of these can be mitigated to less-than-significant with the incorporation of mitigation measures specified in Section 4.6, with the exception of Impact C4.6-7 (continuing operations of the Quarry and simultaneous reclamation would result in continuing incompatibility with neighboring residential and recreational land uses), which is found to be significant and unavoidable. ~~Other~~ The significant impacts which can be mitigated are related to potential conflicts between post-reclamation end-uses specified in ARP04 and City, County, and Bay Conservation and Development Commission (BCDC) land use policies, ~~and with the incompatibility of reclamation activities with neighboring land uses.~~

The No Project/Status Quo Alternative would retain the post-reclamation land uses from ARP82, which are compatible with City, County, and BCDC policies. Furthermore, this alternative would result in reclamation of the site much sooner and over a shorter time span than the project, reducing the severity of the land use incompatibility impacts.

The alternative end uses described in the Alternative Reclamation with Alternative Beneficial End Use Alternative would likely be compatible with City, County, and BCDC policies, including those regarding width of buffer areas around sensitive habitat and setbacks from the shoreline.

The Mitigated Alternative offers the probability of reduced reclamation grading activities conflicting with surrounding land uses. Furthermore, this alternative includes measures consistent with the Countywide Plan Update for sustainability and reduced ecological footprint to be incorporated into the proposed future marina, residential, and commercial end use development.

Noise

The only significant noise impact of the ARP project is associated with construction and later dismantling of the proposed berm on the northern side of the NE Quadrant. This impact, though temporary, would remain significant and unavoidable even with the incorporation of ~~be reduced to less than significant with incorporation of~~ specified mitigation measures.

While each of the alternatives would be expected to have noise impacts associated with various reclamation activities, it is likely that these, ~~too,~~ would either be less than significant, or could be mitigated to less than significant. Therefore, the noise impacts of ~~the project and the alternatives would be about the same.~~ likely be less than the project.

Hazards

The primary public health impact of the project, related to toxic air emissions, is considered in the Air Quality discussion above. The Hazards section in Chapter 4 (Section 4.8) notes one potentially significant impact of the project: hazardous materials transported or used onsite during proposed mining and reclamation activities, such as petroleum products, could be spilled or otherwise

released through improper handling or storage. This impact would be reduced to less than significant through incorporation of specified mitigation measures. Each of the alternatives would have a similar impact that could be mitigated in similar fashion.

Public Services, Utilities, and Energy

As described in Section 4.9, there are no significant impacts of the project related to public services, utilities, and energy. Neither would any of the alternatives be expected to have such an impact. The Mitigated Alternative and the Alternative Reclamation with Alternative Beneficial End Use Alternative, however, includes alternative energy generation facilities and other features that would have a greater beneficial impact on energy supply, compared to the project. ~~The Alternative Reclamation with Alternative Beneficial End Use Alternative includes development of a municipal water supply reservoir which would be a benefit not realized by the project.~~

Transportation and Traffic

The project is not expected to result in significant traffic impacts; see Section 4.10. This is due to the low traffic-generation predictions for reclamation activities, and the similarity of post-reclamation land uses under ARP04 and ARP82. None of the alternatives would be expected to have adverse traffic impacts. Reclamation activities would be similarly limited in their traffic generating potential. Post-reclamation land uses would be the same as the project, or, in the case of the Alternative Reclamation with Alternative Beneficial End Use Alternative, lower density.

Cultural Resources

The project is expected to have several significant impacts on cultural resources, including the potential to disturb previously unknown paleontological, anthropological, or historical resources; and impacts to historic resources associated with disturbance or removal of historic structures on the site. It is unclear whether ARP04 could be implemented with mitigation measures that would reduce some of these impacts to less than significant, particularly those associated with destruction of historic buildings. The Mitigated Alternative specifies retention of historic structures, where adaptive re-use or preservation is feasible. The other alternatives would likely result in the same fate for the historic structures as the project, though the Alternative Reclamation with Alternative Beneficial End Use Alternative holds open the possibility that some or all of McNear's Brickyard structures could be retained for re-use and incorporation into ~~the resource interpretive~~ a conference center and/or educational facility.

Mineral Resources

The project itself would not maximize utilization of the mineral resources on the project site, since it foregoes complete mining of South Hill, which contains a substantial deposit of high quality mineral resource. The No Project/Status Quo Alternative would result in a substantial reduction in the use of the mineral resources of the site. The Mitigated Alternative and the Alternative Reclamation with Alternative Beneficial End Use Alternative would not alter the final

grades from those proposed, and so would not represent a change from the project in the use of mineral resources.

Population and Housing

The project as proposed is not expected to create a demand for new housing nor to interfere with or remove existing or planned housing, and so is not expected to have a significant impact on population and housing. The No Project/Status Quo Alternative and the Mitigated Alternative would involve the same post-reclamation end uses as the project, including the creation of a substantial number of new housing units, consistent with City and County general plans. The Alternative Reclamation with Alternative Beneficial End Use Alternative specifies lower density, mostly non-residential post-reclamation uses, and so would create fewer housing units, which may be seen as a significant impact of this alternative.

Recreation

As described in the Section 4.6, Land Use and Planning, the project could interfere with planned recreational use of the shoreline after reclamation, though this impact can be mitigated to less than significant. The Mitigated Alternative avoids this impact in the first place, and the No Project/Status Quo Alternative also would not involve this impact. The Alternative Reclamation with Alternative Beneficial End Use Alternative would also enable access to the shoreline, ~~but would result in somewhat decreased~~ and may result in increased recreational opportunities associated with post-reclamation use of the flooded Main Quarry Bowl, since the bowl under this alternative would ~~be a municipal water supply reservoir with appropriately restricted recreational uses remain dry,~~ and could be used for recreational purposes, including rock climbing and as a performance venue.

**TABLE 6-1
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT**

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Aesthetics				
Impact R4.1-1: Visual impacts on the view from Vantage Point 3, the public walkway and public road southwest of the site	Impact can be mitigated to less than significant	Alternative may have significant impacts due to removal of historic buildings that contribute to visual character of the area	Impact would be avoided with incorporation of mitigation measures	Alternative would avoid impact by retaining historic structures
Impact R4.1-2: Visual impacts on the view from Vantage Point 5, Via Montebello near San Marino Drive in the Peacock Gap Neighborhood	Impact can be mitigated to less than significant	Alternative may have significant impacts due to removal of historic buildings that contribute to visual character of the area	Impact would be avoided with incorporation of mitigation measures	Alternative would avoid impact by retaining historic structures
Air Quality				
Impact R4.2-1: The proposed Amended Reclamation Plan would result in an increase in daily emissions of criteria air pollutants as a result of reclamation activities being conducted simultaneous with mining activities, instead of at the end of quarrying activities, as contemplated in the 1982 Amended Reclamation Plan. This increase in daily emissions would exceed the Bay Area Air Quality Management District-established significance thresholds for reactive organic gases, nitrogen oxides, carbon monoxide, and particulate matter equal to or less than 10 microns.	Impact would remain significant and unavoidable after mitigation	Impact would be similar, but for a shorter duration	Impact would be reduced, but likely still significant	Impact would be similar would be avoided in specified mitigation measures were incorporated.
	<u>Impact can be reduced to less than significant with mitigation.</u>	<u>Impacts would be expected to be significant.</u>	<u>Impact would be avoided with incorporation of mitigation measures</u>	
Impact R4.2-2: Phase 4 of 2004 Amended Reclamation Plan would include cut and fill activities that were not included in 1982 Amended Reclamation Plan. These new reclamation activities would result in emissions of criteria pollutants that would exceed Bay Area Air Quality Management District significance thresholds.	Impact would remain be reduced to less than significant and unavoidable after mitigation	Impact would be similar	Impact would be reduced, but likely still to less than significant with mitigation.	Impact may be somewhat reduced, if reclamation involved less grading activity.
	<u>Impact would be reduced to less than significant and unavoidable after mitigation</u>	<u>Impacts would be expected to be significant.</u>	<u>Impact would be reduced, but likely still to less than significant with mitigation.</u>	

**TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT**

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Impact R4.2-3: Reclamation activities will generate greenhouse gas emissions that will contribute to climate change	Impact can be reduced to less than significant	Emissions would be over a shorter period and therefore the impact would be less; however, Without mitigation, emissions would be significant	Emissions would be over a shorter period and therefore the impact would be less severe. Mitigation measures would reduce to less than significant	Impact may be somewhat reduced, if reclamation involved less grading activity
Impact R4.2-5: The proposed Amended Reclamation Plan would result in post-reclamation development and land uses that will emit greenhouse gasses, and contribute to global climate change	Impact can be reduced to less than significant	Emissions would be over a shorter period and therefore the impact would be less <u>Without mitigation, emissions would be significant</u>	Emissions would be over a shorter period and therefore the impact would be less <u>Mitigation measures would reduce to less than significant</u>	Post-reclamation land uses would be of lower intensity and would produce fewer GHG emissions.
Impact C4.2-9: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including diesel particulate matter, increasing the risk of cancer among nearby sensitive receptors	Impact can be reduced to less than significant	Emissions would be over a shorter period and therefore the impact would <u>likely</u> be less	Emissions would be over a shorter period and therefore the impact would <u>likely</u> be less	Impact may be somewhat reduced, if reclamation involved less grading activity.
Impact C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the Amended Surface Mining and Quarrying Permit (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan, and post-reclamation land uses could cause significant cumulative health effects	Impact would remain significant and unavoidable after mitigation	Impact would remain significant and unavoidable after mitigation	Impact would remain significant and unavoidable after mitigation	Impact would be somewhat less, due to less reclamation grading

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Biological Resources				
Impact R4.3-2: Reclamation activities during Phases 1 through 4, as well as post-reclamation uses of the site will result in the loss of native vegetation at San Rafael Rock Quarry, including mixed perennial grassland, coastal scrub, and coast live oak woodlands.	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater.	Impact would be reduced to less than significant	Impact would be less, since more open space and natural areas would be created.
Impact R4.3-3: Reclamation activities implemented in Phases 1 through 4 could result in temporary disturbance to or mortality of Point Reyes bird's beak and Gairdner's yampah	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater.	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created.
Impact R4.3-4: Reclamation activities implemented in Phases 1 through 4, as well as post-reclamation development could result in damage to or removal of protected trees that are within or adjacent to areas to be reclaimed or developed	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created
Impact R4.3-5: Reclamation activities as well as post-reclamation development could result in substantial adverse effects on wetlands and waters of the U.S. under the jurisdiction of the Army Corps of Engineers, waters of the State under the jurisdiction of California Department of Fish and Game or the Regional Water Quality Control Board, and waters and land under Bay Conservation and Development Commission and State Lands Commission	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
jurisdiction, and would be inconsistent with standards established for the Baylands Corridor in the 2007 Countywide Plan Update				
Impact R4.3-6: Reclamation activities and post-reclamation development activities such as dredging, pile driving, jetty construction, and other "in-water" construction activities would result in temporary disturbances to aquatic biological resources and Essential Fish Habitat (EFH)	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since this alternative does not entail breaching a channel to the Bay
Impact R4.3-7: Poor water quality in the deep water within the flooded Main Quarry Bowl could occur due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. This condition could result in impacts to special-status aquatic species	Impact would remain significant and unavoidable , <u>can be reduced to less than significant with mitigation measures incorporated.</u>	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater, though with lesser depth of harbor, pool of poor quality water would be smaller	Impact would remain significant and unavoidable , <u>can be reduced to less than significant with mitigation measures incorporated</u>	Impact could be significant and unavoidable, but depends on configuration and management of the fresh water reservoir , <u>would be avoided.</u>
Impact R4.3-8: Reclamation activities conducted in the vicinity of the process water ponds in the NW Quadrant have the potential to adversely impact California red-legged frog	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created
Impact R4.3-9: Reclamation activities and post-reclamation development activities conducted in the vicinity of the process water ponds in the NW Quadrant have the potential to impact northwestern pond turtles	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Impact R4.3-10: Reclamation and post-reclamation development activities resulting in the destruction of abandoned buildings or tree removal within the San Rafael Rock Quarry could adversely impact special status bat species	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created
Impact R4.3-11: Reclamation activities and post-reclamation development could adversely affect special-status nesting raptors and other nesting birds	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater.	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created.
Impact R4.3-12: Post-reclamation residential and commercial development adjacent to marsh habitat could result in long-term adverse impacts to special-status species inhabiting the adjacent marsh habitat through increases in the levels of human noise and activity, lighting, as well as the introduction of domestic animals	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less, since more open space and natural areas would be created.
Impact C4.3-18 Impacts of the ARP and AQP on the salt marshes present at the project site would make a considerable contribution to cumulative impacts on marsh habitat	Contribution of project to this cumulative impact can be reduced to less than significant	ARP82 called for restoration of tidal circulation, which would reduce this impact	Contribution of Alternative to this cumulative impact can be reduced to less than significant	Alternative calls for early marsh restoration, which would eliminate this impact
Geology, Soils, and Seismicity				
Impact R4.4-1: Prior to the completion of site reclamation, the project site could be subject to slope instability hazards, including landslides, debris flows, and rockfalls caused by seismic or non-seismic mechanisms	Impact can be reduced to less than significant	Existing permits do not contain mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be similar, assuming same geotechnical analysis applied

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Impact R4.4-2: Soil erosion of exposed cut or fill slopes, native slopes with removed vegetation, and soil stockpiles could result in soil erosion and loss of topsoil	Impact can be reduced to less than significant	Existing permits do not contain mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be the same, assuming mitigation measures would apply
Impact R4.4-3: Unstable slopes or soils could adversely affect post-reclamation land uses of the Quarry site	Impact can be reduced to less than significant	Existing permits do not contain protections of mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be the same or less, since end uses would be less intensive
Hydrology and Water Quality				
Impact R4.5-2: Grading associated with the proposed project would increase the potential for eroded sediments to degrade the quality of surface water sources including the San Francisco Bay	Impact can be reduced to less than significant	Existing permits contain weaker stormwater pollution prevention measures. Impact would be greater.	Impact can be reduced to less than significant	Impact would be the same, assuming similar mitigation measures would apply
Impact R4.5-6: Poor water quality conditions could occur in the deep water within the flooded Main Quarry Bowl due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin	Impact would remain significant and unavoidable <u>can be mitigated to less than significant.</u>	Under existing ARP, final depth of the Main Quarry Bowl would be shallower than proposed, reducing, but probably not eliminating, this impact	Impact can be reduced to less than significant. but with likely secondary significant impacts	Poor water quality may also occur in a freshwater reservoir due to stratification, but without affect on San Francisco Bay water quality <u>Impact would be avoided.</u>
Impact R4.5-8: The project reclamation and post-reclamation activities would result in an increase in the possibility of inundation by a mudflow, seiche, tsunami, or sea level rise	Impact can be reduced to less than significant	Impact likely to remain significant and unavoidable	Impact can be reduced to less than significant	Same impact may apply, though severity would be less than the project, since land use around the flooded quarry bowl would not include housing or commercial areas <u>Impact would be avoided.</u>
Impact R4.5-10: Post-reclamation development could produce stormwater runoff that would result in a degradation of surface water quality	Impact can be reduced to less than significant	Existing permits do not contain mitigation measures specified in this report; therefore, the impact would be greater	Impact can be reduced to less than significant	Impact would be less or no impact

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Land Use and Planning				
Impact R4.6-3: ARP04 would conflict with existing uses at the periphery of the project site as a result of incompatible land uses.	Impact can be reduced to less than significant	Similar impact likely to occur after cessation of quarrying, likely to be significant	Impact can be reduced to less than significant	Impact could be reduced and limited with appropriate mitigation measures
Impact R4.6-5: Activities associated with the phased implementation of the reclamation plan would conflict with County Code Title 22 (Section 22.112.020) restrictions on nonconforming uses	Impact can be reduced to less than significant	Impacts related to reclamation grading would occur after cessation of quarrying <u>would likely be significant already contemplated in ARP82 so would not constitute an intensification of use</u>	Impact can be reduced to less than significant	Impact could be reduced and limited with appropriate mitigation measures
Impact C4.6-7: Continuing operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit and simultaneous phased reclamation grading under the Amended Reclamation Plan would result in continuing incompatibility with neighboring residential and recreational land uses	Impact would remain significant and unavoidable	Under this Alternative, quarrying would cease and reclamation of the site would proceed; impact would be reduced	Impact would be reduced, possibly to less than significant	Impact would be reduced, possibly to less than significant
Noise and Vibration				
Impact R4.7-1: Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations (Beneficial).	Short-term impact would be significant and unavoidable	Similar impact would occur after cessation of mining	Lesser impacts would occur during early phased reclamation grading and restoration of natural areas; additional impact would occur after cessation of mining	Lesser impacts would occur during early phased reclamation grading and restoration of natural areas; additional impact would occur after cessation of mining
Hazardous Materials				
Impact R4.8-1: Hazardous materials transported or used onsite during proposed mining and reclamation activities (i.e., petroleum products,) could be spilled or otherwise released through improper handling	Impact can be mitigated to less than significant	Without mitigation, impact could be significant	Impact can be mitigated to less than significant	Impact can be mitigated to less than significant

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
or storage				
Public Services, Utilities, and Energy	No significant impacts of the ARP.	Alternative would not have significant impacts	Alternative would not have significant impacts	Alternative would not have significant impacts
Transportation and Traffic	No significant impacts of the ARP	Alternative would not have significant impacts	Alternative would not have significant impacts	Alternative would not have significant impacts
Population and Housing	No significant impacts of the ARP	Alternative would not have significant impacts	Alternative would not have significant impacts	Alternative would not have significant impacts
Cultural Resources				
Impact R4.12-1: Phased reclamation grading activities could result in adverse effects to prehistoric or unique archaeological resources, including those previously unidentified	Impact can be reduced to less than significant	Issue likely to be resolved through final Development Plan	Impact can be reduced to less than significant	Impact can be reduced to less than significant
Impact R4.12-3: Construction of the top soil stockpile fill area "F" under Phase 1 of the proposed project would demolish or substantially alter the c. 1910 Caretaker's Residence, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5	Impact can be reduced to less than significant	Impact may remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant
Impact R4.12.-4: Construction of the surcharge berm under Phase 2 of the proposed project would demolish or substantially alter the McNear's Brickyard c. 1902 Boarding House and Office, two potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5	Impact can be reduced to less than significant	Impact may remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant

TABLE 6-1 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE ARP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative End Use Alternative
Impact R4.12.-5: Reclamation activities in the SW Quadrant under Phase 3 of the phased grading plan may demolish or substantially alter the former c. 1935 U.S. Army Signal House, a potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5	Impact can be reduced to less than significant	Impact may remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant
Impact R4.12.-6: Reclamation grading phase 4 of the 2004 Amended Reclamation Permit would demolish four potentially eligible historic buildings at McNear's Brickyard, including 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4)c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. Even with the possible retention of Hoffman Kiln #1 under the Amended Reclamation Plan, Phase 4 would additionally alter the historic setting of Hoffman Kiln #1 to the extent that it would no longer qualify for listing in the National Register of Historic Places or California Register of Historic Resources	Impact can be reduced to less than significant	Impact may remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant

SOURCE: Environmental Science Associates

Ability of the Alternatives to Meet Project Objectives

As shown in Table 6-2, the project itself appears to have the ability to meet all of its own objectives. Each of the three alternatives also has the ability to meet at least some of the project objectives, though the No Project/Status Quo alternative would meet fewer of the project’s objectives than the other alternatives.

**TABLE 6-2
ABILITY OF ALTERNATIVES TO SATISFY AMENDED RECLAMATION PLAN PROJECT OBJECTIVES**

Project Objective	No Project/Status Quo Alternative	Mitigated Alternative	Alternative Reclamation with Alternative Beneficial End Use Alternative	Project
Adopt an amended reclamation plan that is consistent with the current requirements of SMARA and that has been subjected to current environmental review requirements of CEQA;	Does not meet objective	Meets objective	Meets objective	Meets objective
Adopt an amended reclamation plan that reflects SRRQ’s intent to mine to a greater depth (average depth of the Main Quarry Bowl -350 feet msl; maximum depth -400 feet msl) and for a longer period of time (through approximately 2024) than stated in the previous amended reclamation plan;	Does not meet objective	Meets objective	Meets objective	Meets objective
Update technical information regarding quarry ownership, legal, and regulatory status;	Meets objective	Meets objective	Meets objective	Meets objective
Adopt a phased reclamation schedule in order to begin certain reclamation activities as mining on the site proceeds and to begin as soon as possible to prepare the site for post-reclamation uses. Achieve site preparation for reclamation without importation of additional fill;	Does not meet objective	Does not meet objective	Meets objective	Meets objective
Update and confirm the post-reclamation uses already planned in the prior amended reclamation plan; and	Meets objective	Meets objective	Does not meet objective	Meets objective
Transfer prior approved ARP82 conditions that are relevant to the Quarry operations, to the currently proposed Amended Surface Mining and Quarrying Permit activities.	Meets objective	Meets objective	Meets objective	Meets objective

SOURCE: Environmental Science Associates

Amended Reclamation Plan: Environmentally Superior Alternative

As described above and summarized in Table 6-1, each of the three alternatives would likely result in fewer significant impacts than the project. However, the No Project/Status Quo Alternative would result in impacts not associated with the project, notably interference with the extraction of the mineral resource. The Mitigated Alternative, ~~while reducing would reduce~~ most of the ~~air quality significant~~ impacts of the project, ~~would likely cause another air quality impact associated with diesel emissions from increased barge traffic necessary to backfill the Main~~

~~Quarry Bowl~~, without causing new impacts. The Alternative Reclamation with Alternative Beneficial End Use Alternative avoids or reduces most impacts associated with the project as proposed.

In conclusion, the Mitigated Alternative and the Alternative Reclamation with Alternative Beneficial End Use both appear to have the ability to meet most of the project objectives, to reduce significant impacts associated with the project, and to result in additional benefits not realized by the project itself. Therefore, these two alternatives are coequally the Environmentally Superior Alternative.

6.3 Alternatives to the Amended Surface Mining and Quarrying Permit

This EIR considers eight alternatives to the Amended Surface Mining and Quarrying Permit (AQP) four of which are selected for further analysis because of their feasibility, their ability to meet most of the basic objectives of the project, and because they provide a reasonable range of alternatives to the project. The four alternatives selected for analysis are:

- No Project/Status Quo Alternative
- Mitigated Alternative
- Reduced Alternative
- Barge Only Alternative

The four rejected alternatives are:

- No Blasting Alternative
- No Mining of South Hill Alternative
- Off-site Alternative
- Off-site Processing Alternative

Below, each of the four alternatives selected for analysis is described and its potential environmental impacts and ability to meet basic project objectives are compared with the proposed project.

6.4 Amended Surface Mining and Quarrying Permit Alternatives Considered but Rejected

In addition to the four alternatives selected for further analysis, the Lead Agency considered several other possible alternatives. Upon consideration, however, these alternatives were rejected because of one of three reasons: the alternative failed to meet most of the basic project objectives; the alternative was found to be infeasible; or the alternative did not have the ability to avoid the significant environmental impacts identified for the project. These rejected alternatives are discussed briefly, along with the specific reason that they were rejected.

No Blasting Alternative

This alternative would eliminate blasting from quarry operations. This alternative would be infeasible for the reasons stated in the Revey Report (use of expansive media is not applicable at this scale; use of hydraulic hammers would cause equal or greater impacts on air quality and as well as noise and vibration impacts).

No Mining of South Hill Alternative

This alternative would eliminate further mining of South Hill. This alternative would not be feasible because SRRQ already has a vested right to mine South Hill to the extent described in ARP82.

Off-site Alternative

This alternative would end mining at SRRQ in favor of mining similar rock resource in another location that may be more compatible with surrounding land uses. This alternative is considered infeasible because no other designated mineral resource areas exist in the vicinity.

Off-site Processing Alternative

Under this alternative, unprocessed rock would be shipped off-site by truck or barge for processing, including size-reduction and grading. This alternative is considered infeasible because it does not appear to have the ability to reduce or avoid significant impacts associated with the project, most notably air quality impacts, most of which are associated with mobile on-site and off-site diesel equipment operation.

6.45 Analysis of Amended Surface Mining and Quarrying Permit Alternatives

Each of the alternatives selected for inclusion in the alternatives analysis is described below. The impacts associated with each alternative are compared to the AQP project's impacts in Table 6-3. The ability of each alternative to meet project objectives is presented in Table 6-4.

No Project / Status Quo Alternative

Alternative Description

The required No Project Alternative must examine the existing conditions and reasonably foreseeable future conditions that would exist if the project were not approved (CEQA *Guidelines* §15126.6(e)). This alternative assumes no action would be taken to amend the existing Surface Mining and Quarrying Permit (SMQP), as currently proposed. The conditions of the existing SMQP would continue in force as long as the Quarry is operating in compliance with its other permits (including a valid, adopted reclamation plan). In addition, the County's understanding of the types of activities occurring on site, as well as the level of production and shipping when the

Quarry became a legal non-conforming use in 1982 would continue to apply. These include the following:

- Production levels would be limited to 1982 levels;
- Shipping by truck would be limited to apparent 1982 levels;
- Conditions of approval contained in the SMQP and ARP82 would remain in effect.

Effect of Alternative on Reclamation

This alternative would have no effect on reclamation as planned in ARP04.

Mitigated Alternative

Alternative Description

The Mitigated Alternative would include all mitigation measures identified in the EIR, would eliminate or alter those aspects of the proposed AQP that have the greatest likelihood of causing significant impacts, and would include other, environmentally beneficial project components not contained in the applicant's proposal. This would include the following:

- Limiting production to 1982 levels;
- Limiting hours and days of operation;
- Limiting or conditioning noise-generating operations;
- Restricting truck traffic to a maximum of 250 vehicle trips per day;
- Restricting blasting according to recommendations contained in the Revey report (Appendix J) to reduce vibrations and effects on neighbors;
- Limiting dust emissions through implementation of best management practices;
- Accelerated reduction of diesel PM emissions in advance of federal requirements;
- Development of renewable energy generation projects on the property, such as solar power generation or tidal power generation, to the extent that they are feasible and would not interfere with ongoing quarrying operations;
- Limiting asphalt production to current levels (not levels currently permitted by BAAQMD);
- Inclusion of mitigation efforts currently self-imposed by the applicant, including noise reduction measures.

Effect of Alternative on Reclamation

This alternative may result in decreased production, and so may delay achievement of final reclamation grades: the Quarry may operate longer under this Alternative.

Reduced Alternative

Alternative Description

This alternative incorporates suggestions for project alternatives contained in scoping comments from neighbors of the Quarry. The intent of the alternative is to reduce the intensity of operations and to reduce the incompatibility of quarry operations with other land uses in the area. This alternative includes the following provisions:

- Production levels would be limited to 1982 levels; All mitigation measures associated with the proposed project that are still relevant to the reduced project operations would be applied to this alternative as well;
- ~~Further reduce noise and dust through enclosure of crushing, sorting, and barge loading operations;~~
- ~~Dust emissions would be further reduced by paving all roads used by trucks and heavy equipment that will be in use for more than 3 months;~~
- The Quarry would be required, within 1 year of issuance of an Amended Surface Mining and Quarrying Permit, to prepare a more specific engineering and economic evaluation and report of measures to reduce noise and dust from Quarry operations. This evaluation would include an examination of the increased scope and effectiveness of the dust and noise control measures used for the blasting, crushing, sorting, and barge loading operations. The evaluation would include examination of the economic feasibility, as defined by the Bay Area Air Quality Management District (BAAQMD), of all applicable measures contained in that agency's Best Available Control Technologies (BACT) guidebook, including the following: (1) enclosure of jaw/cone crushers, screens, conveyors and all material transfer points and vent to bag houses with filtration of at least 0.01 gram per dry standard cubic foot; and (2) spraying of storage piles and site road surfaces with water or chemical suppressants. The evaluation would also include an examination of additional measures to reduce dust associated with blasting, including investigation and trial of a pre-blast water spray curtain. Furthermore, the evaluation would examine additional measures to reduce fugitive dust emissions produced by trucks and heavy equipment operating over unpaved surfaces. This would include examination of the option to pave roads, and would also consider air emissions due to paving and removing pavement. The Quarry would be required to implement all feasible measures within one year of report submittal (within two years of issuance of the permit). Determination of increased scope of dust control measures would use the BAAQMD's established cost limits for Best Available Control Technologies. The current standard is \$5,300 per ton of PM-10 reduction.
- ~~Blasting would be limited such that ground motion at the nearest residence is below that recommended in the Revey report. Minimum scaled distance would be $90.8 \text{ ft } \text{lb}^{1/2}$; this design would result in a maximum does not exceed a does not exceed a PPV of .125 0.25 inches per second. In addition, the Quarry would be required to give 36-hour advance notice of blast times and predicted intensity, and to The standard for blasting vibrations is intended to produce no more than a "barely perceptible" level inside of structures. A binding dispute resolution mechanism would be instituted to resolve allegations by residents of violations of this standard institute a complaint resolution mechanism, with notification to the County Department of Public Works quarterly, of complaints received, and how and when they were resolved between the complainant and Quarry operators;~~

- Truck trips would be limited to a maximum of 125 one-way trips per day, Monday-Friday, 7 p.m. to 5 p.m., except during times of declared emergencies;
- Quarry operations would be limited to 7 a.m. to 5 p.m., Monday-Friday, except during times of declared emergencies.
- Loaded trucks to be washed down and tarped prior to leaving the Quarry, and to use the right lane only of Point San Pedro Road. This latter provision will be required for SRRQ's own trucks and contracted trucks, and encouraged for non-SRRQ trucks through a trucker management and education program to be conducted by the applicant. This program will include signs posted at the facility exit scales and metering light stating that loaded trucks must use only the right lane of Point San Pedro Road;
- Conversion of ~~the~~ SRRQ's truck fleet used for company inter-facility product transfers and deliveries from SRRQ to higher standard engines to reduce emissions, or use of alternative fuel to reduce emissions;
- Use of a state-of-the-art vacuum sweeper on Point San Pedro Rd at least two times per day;
- No ~~quarry operations that increase air pollution, including~~ blasting, on declared "Spare the Air Days," except in times of declared emergencies;
- Following cessation of operations at McNear's Brickyard, the Quarry ~~to~~ would develop a new entry for trucks using the current McNear's Brickyard entry. The maximum number of trucks allowed to use this entry would be no greater than the number of trucks now accessing the Brickyard. This would reduce impacts associated with truck traffic at the ~~enable early reclamation of the area now occupied by the~~ existing haul road into the facility.
- Any shipments to Dutra's Haystack Landing facility in Petaluma by barge only.

Effect of Alternative on Reclamation

This alternative may result in decreased production, and so may delay achievement of final reclamation grades: the Quarry may continue to mine for a longer period of time ~~operate longer~~ under this Alternative. Removal or adaptive reuse of enclosed structures would have to be considered under the Amended Reclamation Plan.

Barge Only Alternative

Alternative Description

Under this alternative, all products from the quarry except asphalt would be shipped by barge, and none by truck, except during times of declared emergencies. All other aspects of the operation would be the same as proposed.

Effect of Alternative on Reclamation

This Alternative would not be expected to affect planned reclamation.

Comparison of Amended Surface Mining and Quarrying Permit Alternatives

The following discussion provides a brief comparison of the likely environmental impacts of the four alternatives with those of the AQP project itself. Per CEQA *Guidelines* §15126.6(d), “The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.” Thus, the analysis of alternatives need not be as exhaustive as that of the project itself. The discussion below is divided by issue area, such as Air Quality and Biological Resources. For each issue area, a comparison is drawn between potential effects of the project and those of the alternatives. This comparison is summarized in Table 6-3.

Aesthetics

The only significant effect on aesthetics of the project would be a potential to produce additional nighttime light and glare; this impact can, however be mitigated. The No Project/Status Quo alternative includes continuation of existing conditions of approval of ARP82, amongst which is the shielding of nighttime lights. Both the Mitigated Alternative and the Reduced Project alternative would limit hours of operation to daylight hours only, thus avoiding this impact altogether. The Barge Only Alternative has the potential to exacerbate the nighttime light and glare impact, and also to cause an impact, likely less than significant, related to increased barge traffic and barge loading operations.

Air Quality

The project is expected to have significant unavoidable air quality impacts, including ~~increased emissions of criteria air pollutants and~~ toxic air contaminants (TACs) that would contribute to cumulative health risks that exceed BAAQMD significance thresholds and pose a health risk to

neighbors of SRRQ. The No Project/Status Quo Alternative would likely have similar impacts. The Mitigated Alternative would reduce, but not eliminate these impacts, while the Reduced Alternative can be expected to reduce the severity of air quality impacts associated with Quarry operations further, perhaps below the significance threshold. The Reduced Project Alternative, could, however, result in the increased use of aggregate materials brought from a greater distance than SRRQ (such as Canada), which would have adverse consequences for air quality, including increased emissions of criteria air pollutants, toxic air contaminants, and greenhouse gases both within the Bay Area air basin and beyond.

The Barge Only Alternative would eliminate that portion of air quality impacts associated with use of heavy-duty diesel trucks for transport of materials directly from SRRQ, but would increase the emissions from tug boats. Still, these emissions would be expected to have a lesser health risk impact on Quarry neighbors than emissions from trucks, since the barge loading and transport are more remote from sensitive receptors. The Barge Only Alternative may, however, not result in the elimination of truck trips and truck-related emissions generated by the Quarry overall, but merely their transfer to another location, since the Quarry would likely barge some materials to another facility where they would be transferred to trucks for transport to the point of use. Therefore, the Barge Only Alternative may cause air quality and traffic impacts that are equal to, or possibly greater than, those of the project and potentially result in geographically broader ranging truck traffic, air quality, and other effects in the region beyond Marin County. The elimination of trucks from the Quarry would also eliminate transport of products from SRRQ within most areas of Marin not accessible by barge.

Biological Resources

The AQP project is expected to have several significant impacts on biological resources, particularly on special status wildlife and on sensitive habitats. However, all of these impacts can be mitigated to less-than-significant, as would also occur with the Mitigated Alternative. The Reduced Project Alternative is capable of further reducing physical impacts, which may have a deleterious effect on biological resources as well as people. ; this Alternative also has the advantage of moving the entryway to the facility to use the existing McNear's Brickyard entrance, enabling abandonment of the existing road and enhancing the ability to restore the marshes.

The Barge Only Alternative would not be expected to have substantially different impacts on biological resources than the project as proposed.

Geology, Soils, and Seismicity

Neither the project as proposed, nor any of the alternatives, would be expected to have a significant impact on geology, soils, and seismicity.

Hydrology and Water Quality

Neither the project as proposed, nor any of the alternatives, would be expected to have a significant impact on hydrology and water quality.

Land Use and Planning

There are several significant land use and planning impacts associated with the project, including a cumulatively considerable contribution to a fundamental, irreconcilable conflict with surrounding land uses. The No Project/Status Quo would worsen these impacts, since fewer controls would be placed on operations; the Mitigated Alternative would decrease impacts, but they would remain significant.

The Barge Only Alternative would remove perhaps the most annoying, incompatible aspect of Quarry operations for neighbors of SRRQ: truck traffic on Point San Pedro Road. However, other aspects of Quarry operations, including blasting and operations-related noise and dust, would continue to contribute to the incompatibility of land uses.

The Reduced Project Alternative is specifically crafted to reduce land use incompatibility. While such incompatibility would remain with this Alternative, the provisions for limitations on mining operations may reduce the impact to less than significant.

Noise

The only significant noise and vibration impact of the project is associated with blasting, but this impact can be reduced to less than significant with incorporation of mitigation measures. The No Project Alternative would increase this impact, and may have other noise impacts as well, since operations would be less constrained. The Mitigated Alternative also reduces ~~but does not eliminate~~ this impact; with incorporation of the same mitigation measures, and the Barge Only Alternative would ~~have no effect on reducing~~ also reduce this impact to less than significant.

The Reduced Project Alternative ~~further~~ also reduces the maximum intensity of blasts, and adds other provisions to improve communications and conflict resolution between the Quarry and its neighbors. ~~This Alternative is the only one that has the potential to reduce this impact to less than significant.~~

Hazards

The primary public health impact of the project, related to air emissions, is considered in the Air Quality discussion above. Section 4.8 notes one potentially significant impact of the project: transport, storage, and use of explosives could result in accidental explosions or exposure to hazardous substances. This impact can be reduced to less than significant with incorporation of specified mitigation measures, which would also be included in the Mitigated Alternative. ~~The No Project Alternative, the Reduced Alternative, and the Barge Only Alternative.~~ The No Project Alternative would not include Mitigation Measure P4.8-3b, which requires the applicant to prepare a Blasting Plan.

Public Services, Utilities, and Energy

As described in Section 4.9, there are no significant impacts of the project related to public services, utilities, and energy. Neither would any of the alternatives be expected to have such an impact.

Transportation and Traffic

The project is not expected to result in significant traffic impacts. The No Project Alternative would result in more truck traffic, and may cause a significant traffic impact. The Mitigated Alternative would have the same effect as the project, since truck levels are the same. The Reduced Project Alternative would further reduce traffic impacts, and the Barge Only Alternative could be expected to eliminate any local traffic-related impacts of quarrying operations. The Barge Only Alternative may, however, result not in the elimination of truck traffic, but merely the displacement of traffic to another location, since the Quarry would likely barge some materials to another facility where they would be transferred to trucks for transport to the point of use.

Therefore, the Barge Only Alternative could result in a significant traffic impact, while the project would have none.

Cultural Resources

The project has the potential for significant impacts on cultural resources, including the potential to disturb previously unknown paleontological, anthropological, or historical resources. These impacts can be reduced to less than significant with incorporation of specified mitigation measures. The Mitigated Alternative would therefore mitigate these impacts as well. The Barge

Only, No Project/Status Quo, and Reduced Project alternatives have the same potential for such impacts that, unless mitigated, could remain significant.

Mineral Resources

The project itself would not maximize utilization of the mineral resources on the project site, since it foregoes complete mining of South Hill, which contains a substantial deposit of high quality mineral resource. None of the alternatives evaluated in this chapter reduces the ability of SRRQ to mine the resource to the extent permissible under the Quarry's approved Amended Reclamation Plan. Restrictions on hours of operation contained in the Mitigated Alternative and the Reduced Alternative may affect the rate at which the resource can be extracted.

Population and Housing

Neither the project as proposed nor any of the alternatives is expected to have an adverse effect on population and housing.

Recreation

Neither the project as proposed nor any of the alternatives is expected have an adverse effect on recreation.

**TABLE 6-3
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE AQP PROJECT**

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Reduced Alternative	Barge Only Alternative
Aesthetics					
Impact P4.1-9: Proposed nighttime operations would introduce new sources of light and glare	Impact can be reduced to less than significant	Existing permits require measures to reduce light and glare	Impact would be substantially reduced; residual impact can be reduced to less than significant	Impact would be substantially reduced; residual impact can be reduced to less than significant	Impact would <u>may</u> be greater than project
Air Quality					
Impact P4.2-6: Future Quarry operations under the proposed Amended Surface Mining and Quarrying Permit could exceed baseline levels of production, with concomitant increases in emissions of criteria air pollutants above threshold values	Impact can be reduced to less than significant	Impact would be significant and likely unavoidable	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Increased tug emissions would be partly or wholly offset by decreased truck emissions; impact would likely be the same or less than the project and possibility of increased truck emissions displaced to another location
Impact P4.2-7: Proposed amendments to the Surface Mining and Quarrying Permit could result in an increase in greenhouse gas emissions, and contribute to global climate change	Impact can be reduced to less than significant	Impact would be significant and likely unavoidable	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Increased tug emissions would be partly or wholly offset by decreased truck emissions; impact would likely be the same or less than the project and possibility of increased truck emissions displaced to another location
Impact C4.2-9: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including diesel particulate matter, increasing the risk of cancer among nearby sensitive receptors	Impact can be reduced to less than significant	Impact likely to remain significant and unavoidable	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Since majority of DPM exposure is from on-site mobile equipment, this alternative would not substantially increase or decrease cancer risk compared with the project as proposed

TABLE 6-3 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE AQP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Reduced Alternative	Barge Only Alternative
Impact C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the Amended Surface Mining and Quarrying Permit (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan, and post-reclamation land uses could cause significant cumulative health effects	Impact is significant and unavoidable	Impact would be somewhat greater than project	Impact can be reduced, but would remain significant and unavoidable	Impact can be reduced, but would remain significant and unavoidable	Since majority of DPM exposure is from on-site mobile equipment, this alternative would not substantially increase or decrease cancer risk compared with the project as proposed
Biological Resources					
Impact P4.3-13: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect California red-legged frogs should they occur at the Quarry site	Impact can be reduced to less than significant	Without additional protections, impact may be remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Impact would be same as project as proposed
Impact P4.3-14: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect northwestern pond turtle should they occur at the Quarry site	Impact can be reduced to less than significant	Without additional protections, impact may be remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Impact would be same as project as proposed
Impact P4.3-15: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge	Impact can be reduced to less than significant with mitigation.	Impact would remain significant	Impact would be reduced to less than significant	Impact would be further reduced	Impact may be further reduced due to decreased truck traffic

TABLE 6-3 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE AQP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Reduced Alternative	Barge Only Alternative
Impact P4.3-16: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status bats at the Quarry site	Impact can be reduced to less than significant	Without additional protections, impact may be remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Impact would be same as project as proposed
Impact C4.3-18: Impacts of the ARP and AQP on the salt marshes present at the project site would make a considerable contribution to cumulative impacts on marsh habitat	Contribution of the project to this cumulative impact can be reduced to less than significant	Impact would cease with cessation of mining; impact would therefore be less severe. Without mitigation, this impact would be more severe than for the project	Contribution of the project <u>this alternative</u> to this cumulative impact can be reduced to less than significant	Contribution of the project <u>this alternative</u> to this cumulative impact can be reduced to less than significant	Impact would be same as project as proposed
Geology, Soils, and Seismicity	No significant impacts of the AQP	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative
Hydrology and Water Quality	No significant impacts of the AQP	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative
Land Use and Planning					
Impact P4.6-6: The Amended Surface Mining and Quarrying Permit would allow for an intensification of quarry operations beyond 1982 levels, in excess of the Quarry's legal nonconforming use under Title 22 of the County Code	Impact can be mitigated to less than significant	Impact would remain significant	Impact can be mitigated to less than significant	Impact can be mitigated to less than significant	Impact would be somewhat less than the project as proposed, due to absence of truck traffic
Impact C4.6-7: Continuing operation of the Quarry under the proposed Amended Surface Mining and Quarrying Permit and simultaneous phased reclamation grading under the Amended Reclamation Plan would result in continuing incompatibility with neighboring residential and recreational land uses	Impact would remain significant, even with mitigation	Impact would be greater than project as mitigated	Impact would be less than project, but still significant	Impact may be reduced to less than significant	Impact would be less than project, but still significant

TABLE 6-3 (continued)
ABILITY OF ALTERNATIVES TO REDUCE OR AVOID SIGNIFICANT IMPACTS OF THE AQP PROJECT

Impact	Project	No Project / Status Quo Alternative	Mitigated Alternative	Reduced Alternative	Barge Only Alternative
Noise and Vibration					
Impact P4.7-7: Continued blasting at the Quarry would expose neighbors of San Rafael Rock Quarry to vibrations that exceed human annoyance levels	Impact can be reduced to less than significant	Impact likely to remain significant	Impact can be reduced to less than significant	Impact would be further reduced, compared to project <u>can be reduced to less than significant</u>	Impact likely to remain significant <u>can be reduced to less than significant</u>
Hazardous Materials					
Impact P4.8-3: Transport, storage, and use of explosives could result in accidental explosions or exposure to hazardous substances	Impact can be reduced to less than significant	Impact likely to remain significant without additional mitigation	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Impact likely to remain significant without additional mitigation <u>Impact can be reduced to less than significant</u>
Public Services, Utilities, and Energy	No significant impacts of the AQP	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative
Transportation and Traffic	No significant impacts of the AQP	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative <u>Truck traffic could be displaced to another location, possibly resulting in a significant impact</u>
Population and Housing	No significant impacts of the AQP	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative	No significant impacts of this alternative
Cultural Resources					
Impact P4.12-9: Continued quarrying at the project site could adversely affect prehistoric or unique archaeological resources, including those previously unidentified	Impact can be reduced to less than significant	Impact may remain significant	Impact can be reduced to less than significant	Impact can be reduced to less than significant	Impact may remain significant without further mitigation <u>Impact can be reduced to less than significant</u>

SOURCE: Environmental Science Associates

Ability of the Alternatives to Meet Amended Surface Mining and Quarrying Permit Project Objectives

Table 6-4 indicates the ability of the alternatives to meet project objectives. The objectives listed were provided by the applicant. As shown in Table 6-4, the project itself appears to have the ability to meet all of its own objectives. Each of the four alternatives also has the ability to meet at least some of the project objectives, though the No Project/Status Quo alternative would meet fewer of the project's objectives than the other alternatives.

**TABLE 6-4
ABILITY OF ALTERNATIVES TO SATISFY AQP PROJECT OBJECTIVES**

Project Objective	Project	No Project/Status Quo Alternative	Mitigated Alternative	Reduced Alternative	Barge Only Alternative
Continue to operate a facility capable of meeting requirements for rock, aggregate, asphalt, and other materials for public works and private construction projects in Marin County and the San Francisco Bay region, the Sacramento/San Joaquin River Delta, and beyond;	Meets Objective	Meets Objective	Meets objective	Meets objective	Partially Meets Objective
Reduce truck traffic into Marin County by maintaining a local source of these materials, and by maintaining a facility that is capable of delivering materials by barge;	Meets Objective	Meets Objective	Meets objective	Partially Meets Objective	Partially Meets Objective
Maintain operations capable of producing and rapidly delivering, by barge and truck, rip-rap, aggregate, and other materials necessary to respond to public emergencies in Marin County, the San Francisco Bay region, and the San Joaquin/Sacramento River Delta, and beyond;	Meets Objective	Meets objective	Meets objective	Meets objective	Meets Objective
Minimize visibility and noise of operations from the site by maintaining buffer areas and berms;	Meets Objective	Meets objective	Meets objective	Meets objective	Meets objective
Adopt as permanent the operating conditions proposed by the project sponsor in its October 27, 2004 proposal for administrative review of operating conditions, consistent with the Superior Court's Orders of April 19, July 15, and August 9, 2004;	Meets Objective	Does not meet objective	Partially meets objective	Partially meets objective	Partially meets objective
Comply with the interim operating conditions established by the Superior Court's Orders of April 19, July 15, and August 9, 2004, pending adoption of permanent operating conditions that are economically viable.	Meets Objective	Does not meet objective	Partially meets objective	Partially meets objective	Partially meets objective

SOURCE: Environmental Science Associates

Amended Surface Mining and Quarrying Permit: Environmentally Superior Alternative

As described above and summarized in Table 6-4, the No Project/Status Quo Alternative would be expected to have more severe environmental impacts than the project as proposed. The Mitigated Alternative would reduce most project impacts, but several would remain significant and unavoidable. The Barge Only Alternative would not be likely to eliminate impacts related to transport of quarry products by truck, but merely to transfer them to another location; therefore, this Alternative is not considered ~~and so may be considered~~ environmentally superior to the project as proposed. The Reduced Project Alternative, ~~however,~~ may have the potential to reduce all impacts to less-than-significant, while still meeting or partly meeting all of the applicant's project objectives. Therefore, the Reduced Project Alternative is considered the Environmentally Superior Alternative to the AQP.

References – Alternatives

San Francisco Estuary Project, *State of the Estuary Report*,
<http://sfep.abag.ca.gov/reports/soe/soesumm.htm#6>, accessed January 16, 2008.