Volume 2: Appendices

Final

LEHIGH PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

Environmental Impact Report
State Clearinghouse No. 2010042063
Mine ID No. 91-43-0004

Santa Clara County
Department of Planning & Development
Planning Office

May 2012

Volume 2: Appendices

Final

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Santa Clara County
Department of Planning & Development
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May 2012

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December 2011 Draft EIR (located on CD inside front cover)

Volume 2

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APPENDIX A

Notice of Availability (NOA) and Notice of Completion (NOC)

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County of Santa Clara
Department of Planning and Development
Planning Office
County Government Center, East Wing, 7th Floor
70 West Hedding Street
San Jose, California 95110-1705
(408) 299-5770 FAX (408) 288-9198
www.sccplanning.org

File#: 17163 12/22/2011

NOTICE OF AVAILABILITY

THE LEHIGH PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT DRAFT ENVIRONMENTAL IMPACT REPORT STATE CLEARINGHOUSE NO. 2010042063

DECEMBER 23, 2011

LEAD AGENCY: County of Santa Clara

PROJECT TITLE: Reclamation Plan Amendment (Consolidated) for Permanente Quarry (State Mine ID# 91-43-004)

PROJECT LOCATION
The Quarry is located in an unincorporated area of the County west of the City of Cupertino, between 2 and 3 miles west of the intersection of Interstate 280 and Highway 85 in the eastern foothills of the Santa Cruz Mountains. Foothill Expressway, Stevens Creek Boulevard, and Permanente Road provide vehicular access. The address is 24001 Stevens Creek Boulevard, Cupertino, California, 95014.

PROJECT DESCRIPTION
The Permanente Quarry is a limestone and aggregate mining operation. The Applicant proposes to amend the existing 1985 Reclamation Plan for a 20-year period. The modified Reclamation Plan will expand in size to encompass a 1,238-acre area associated with mining operations (the Project Area) within the Applicant's overall 3,510-acre ownership.

The Project Area consists of the existing Quarry pit, two overburden disposal areas referred to as the West Materials Storage Area (WMSA) and the East Materials Storage Area (EMSA), the crusher/Quarry office support area, surge pile, rock plant, approximately 284-acres located south of Permanente Creek that have been disturbed by prior exploratory activities (Exploration Area), approximately 49.2-acres adjacent to Permanente Creek (Permanente Creek Restoration Area or PCRA), and open space areas that serve to physically separate operations at the site from other uses in the surrounding environs.

SIGNIFICANT ENVIRONMENTAL EFFECTS: The County has prepared a Draft Environmental Impact Report (EIR) to address the specific environmental effects of implementing the proposed Project. The Draft EIR identifies significant impacts that would result the project in the following categories: aesthetics, air quality, biological resources, cultural resources, geology/soils, greenhouse gas emissions, hazards, hydrology/water quality, noise. The project is not a listed hazardous waste site.

8-008

PUBLIC REVIEW PERIOD/STATUS: A **60-day public review period** will be provided to receive written comments on the adequacy of the Draft EIR. The comment period will start on **December 23, 2011,** and end on **February 21, 2012**. Written comments regarding the significant environmental effects of this project and the adequacy of the DEIR are welcome should be sent to the following address:

> County of Santa Clara – Planning Office, 70 West Hedding Street, East Wing, 7th Floor, San Jose, CA 95110, Attention: Rob Eastwood, Principal Planner. rob.eastwood@pln.sccgov.org

AVAILABILITY OF THE DRAFT EIR: Copies of the Draft EIR are available for review at the following locations as well as on the County's web site at http://www.sccgov.org/portal/site/planning/.

> County of Santa Clara – Planning Office, 70 West Hedding Street, East Wing, 7th Floor, San Jose, CA 95110, Phone: (408) 299-6740
>
> Cupertino Library, 10800 Torre Avenue, Cupertino CA 95014
>
> Los Altos Library, 13 South San Antonio Road, Los Altos, CA 94022
>
> Saratoga Library, 13650 Saratoga Avenue, Saratoga, CA 95070

PUBLIC MEETINGS

An informational public workshop on the Draft EIR will be held on **January 26, 2012 at 7:00 PM, in the Quinlan Community Center, 10185 N. Stelling Road, Cupertino, CA 95014.** The intent of this meeting is to provide an overview of the Draft EIR and how to provide comments on this document.

A public meeting to receive comments on the adequacy of the Draft EIR will be held on **February 2, 2012, at 1:30 p.m. in the County Government Center, Board of Supervisors Chambers, at 70 West Hedding Street, San Jose, CA 95110** before the Santa Clara County Planning Commission.

Rob Eastwood, Principal Planner, AICP 12/22/11

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #2010042063

Project Title: Lehigh Permanente Quarry Reclamation Plan Amendment

Lead Agency: County of Santa Clara - Planning Office — Contact Person: Rob Eastwood
Mailing Address: 70 West Harding Street, East Wing, 7th Floor — Phone: (408) 299-5792
City: San Jose — Zip: 95110 — County: Santa Clara

Project Location: County: Santa Clara — City/Nearest Community: Cupertino
Cross Streets: Stevens Creek Boulevard/Foothill Expressway — Zip Code: 95014
Longitude/Latitude (degrees, minutes and seconds): 37 ° 19 ′ 12.15 ″ N / 122 ° 06 ′ 23.5 ″ W Total Acres: 1,238
Assessor's Parcel No.: multiple — Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: Interstate 280 — Waterways: Permanente Creek
Airports: San Jose International — Railways: ____ — Schools: Lincoln Elementary

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☒ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ____ Other: ____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: Rec Plan Amend

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☒ Mining: Mineral limestone
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☒ Agricultural Land ☒ Air Quality ☒ Archeological/Historical ☒ Biological Resources ☐ Coastal Zone ☒ Drainage/Absorption ☐ Economic/Jobs
☐ Fiscal ☒ Flood Plain/Flooding ☒ Forest Land/Fire Hazard ☒ Geologic/Seismic ☒ Minerals ☒ Noise ☒ Population/Housing Balance ☒ Public Services/Facilities
☒ Recreation/Parks ☐ Schools/Universities ☐ Septic Systems ☐ Sewer Capacity ☒ Soil Erosion/Compaction/Grading ☒ Solid Waste ☒ Toxic/Hazardous ☒ Traffic/Circulation
☒ Vegetation ☒ Water Quality ☒ Water Supply/Groundwater ☒ Wetland/Riparian ☒ Growth Inducement ☒ Land Use ☒ Cumulative Effects ☒ Other: greenhouse gases

Present Land Use/Zoning/General Plan Designation:

Project Description: *(please use a separate page if necessary)*
Amendment of the existing/approved 1985 Reclamation Plan for a 20 year period. Reclamation Plan area consists of 1,238.7 acres.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "S".

S	Air Resources Board	S	Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
S	Caltrans District # ____		Public Utilities Commission
	Caltrans Division of Aeronautics	S	Regional WQCB # ____
	Caltrans Planning		Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy	X	S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
S	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of	S	SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region # ____		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	X	Toxic Substances Control, Department of
S	Forestry and Fire Protection, Department of	X	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other: ____
	Housing & Community Development		Other: ____
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date December 23, 2011 Ending Date February 21, 2012

Lead Agency (Complete if applicable):

Consulting Firm: ESA	Applicant: Lehigh Southwest Cement Company
Address: 225 Bush Street, Suite 1700	Address: 24001 Stevens Creek Boulevard
City/State/Zip: San Francisco, CA 94104	City/State/Zip: Cupertino, CA 95014
Contact: Janna Scott	Phone:
Phone: (415) 896-5900	

Signature of Lead Agency Representative: [signature] **Date:** 12/14/11

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Revised 2010

APPENDIX B

Draft EIR Newspaper Advertisements

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CALIFORNIA NEWSPAPER SERVICE BUREAU

DAILY JOURNAL CORPORATION

Mailing Address : 915 E FIRST ST, LOS ANGELES, CA 90012
Telephone (213) 229-5300 / Fax (213) 229-5481
Visit us @ WWW.DAILYJOURNAL.COM

SANTA CLARA CO. PLANNING COMM.
70 WEST HEDDING ST.,7TH FL.
SAN JOSE, CA 95110

CNS 2227621

COPY OF NOTICE

Notice Type: GOV GOVERNMENT LEGAL NOTICE

Ad Description LEHIGH PERMANENTE QUARRY RECLAMATION

To the right is a copy of the notice you sent to us for publication in the CUPERTINO COURIER. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

12/23/2011

NOTICE OF AVAILABILITY
The Lehigh Permanente Quarry Reclamation Plan Amendment
Draft Environmental Impact Report State Clearinghouse No. 2010042063
December 23, 2011

LEAD AGENCY: County of Santa Clara

PROJECT LOCATION
The Quarry is located in an unincorporated area of the County west of the City of Cupertino, between 2 and 3 miles west of the intersection of Interstate 280 and Highway 85 in the eastern foothills of the Santa Cruz Mountains. Foothill Expressway, Stevens Creek Boulevard, and Permanente Road provide vehicular access. The address is 24001 Stevens Creek Boulevard, Cupertino, California, 95014.

PROJECT DESCRIPTION
The Permanente Quarry is a limestone and aggregate mining operation. The Applicant proposes to amend the existing 1985 Reclamation Plan for a 20-year period The modified Reclamation Plan will expand in size to encompass a 1,238-acre area associated with mining operations (the Project Area) within the Applicant's overall 3,510-acre ownership.

SIGNIFICANT ENVIRONMENTAL EFFECTS: The County has prepared a Draft Environmental Impact Report (EIR) to address the specific environmental effects of implementing the proposed Project. The Draft EIR identifies significant impacts that would result the project in the following categories: aesthetics, air quality, biological resources, cultural resources, geology/soils, greenhouse gas emissions, hazards, hydrology/water quality, noise. The project is not a listed hazardous waste site.

PUBLIC REVIEW PERIOD/STATUS: A **60-day public review period** will be provided to receive written comments on the adequacy of the Draft EIR. The comment period will start on **December 23, 2011,** and end on **February 21, 2012**. Written comments should be sent to the following address: County of Santa Clara – Planning Office, 70 West Hedding Street, East Wing, 7th Floor, San Jose, CA 95110, Attention: Rob Eastwood, Principal Planner

PUBLIC MEETINGS
An informational public workshop on the Draft EIR will be held on **January 26, 2012 at 7:00 PM, in the Quinlan Community Center, 10185 N. Stelling Road, Cupertino, CA 95014**. A public meeting to receive comments on the adequacy of the Draft EIR will be held on **February 2, 2012, at 1:30 p.m. in the County Government Center, Board of Supervisors Chambers, at 70 West Hedding Street, San Jose, CA 95110** before the Santa Clara County Planning Commission.

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- Cupertino Library, 10800 Torre Avenue, Cupertino CA 95014
- Los Altos Library, 13 South San Antonio Road, Los Altos, CA 94022
- Saratoga Library, 13650 Saratoga Avenue, Saratoga, CA 95070.

12/23/11
CNS-2227621#
CUPERTINO COURIER

A000002462784

CALIFORNIA NEWSPAPER SERVICE BUREAU

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SANTA CLARA CO. PLANNING COMM.
70 WEST HEDDING ST.,7TH FL.
SAN JOSE, CA 95110

COPY OF NOTICE

Notice Type: GOV GOVERNMENT LEGAL NOTICE

Ad Description LEHIGH PERMANENTE QUARRY RECLAMATION

To the right is a copy of the notice you sent to us for publication in the SARATOGA NEWS. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

12/27/2011

CNS 2227645

NOTICE OF AVAILABILITY
The Lehigh Permanente Quarry Reclamation Plan Amendment
Draft Environmental Impact Report
State Clearinghouse No. 2010042063
December 23, 2011

LEAD AGENCY: County of Santa Clara

PROJECT LOCATION
The Quarry is located in an unincorporated area of the County west of the City of Cupertino, between 2 and 3 miles west of the intersection of Interstate 280 and Highway 85 in the eastern foothills of the Santa Cruz Mountains. Foothill Expressway, Stevens Creek Boulevard, and Permanente Road provide vehicular access. The address is 24001 Stevens Creek Boulevard, Cupertino, California, 95014.

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* A 0 0 0 0 0 2 4 6 2 7 7 6 *

before the Santa Clara County Planning Commission.

AVAILABILITY OF THE DRAFT EIR: Copies of the Draft EIR are available for review at the following locations as well as on the County's web site at http://www.sccgov.org/portal/site/planning/.

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12/27/11

CNS-2227645#

SARATOGA NEWS

CALIFORNIA NEWSPAPER SERVICE BUREAU

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70 WEST HEDDING ST.,7TH FL.
SAN JOSE, CA 95110

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12/28/2011

CNS 2227670

NOTICE OF AVAILABILITY
The Lehigh Permanente Quarry Reclamation Plan Amendment
Draft Environmental Impact Report
State Clearinghouse No. 2010042063
December 23, 2011

LEAD AGENCY: County of Santa Clara

PROJECT LOCATION

The Quarry is located in an unincorporated area of the County west of the City of Cupertino, between 2 and 3 miles west of the intersection of Interstate 280 and Highway 85 in the eastern foothills of the Santa Cruz Mountains. Foothill Expressway, Stevens Creek Boulevard, and Permanente Road provide vehicular access. The address is 24001 Stevens Creek Boulevard, Cupertino, California, 95014.

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AVAILABILITY OF THE DRAFT EIR: Copies of the Draft EIR are available for review at the following locations as well as on the County's web site at http://www.sccgov.org/portal/site/planning/.

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- Cupertino Library, 10800 Torre Avenue, Cupertino CA 95014
- Los Altos Library, 13 South San Antonio Road, Los Altos, CA 94022
- Saratoga Library, 13650 Saratoga Avenue, Saratoga, CA 95070.

12/28/11
CNS-2227670#
LOS ALTOS TOWN CRIER

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APPENDIX C
Public Comment Meeting Presentation

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Santa Clara County
Department of Planning & Development

Public Meeting
Lehigh - Permanente Quarry Reclamation Plan Amendment
Draft EIR
File No.: 2250-10P(M1)-10EIR

February 2, 2012

Purpose of Public Meeting

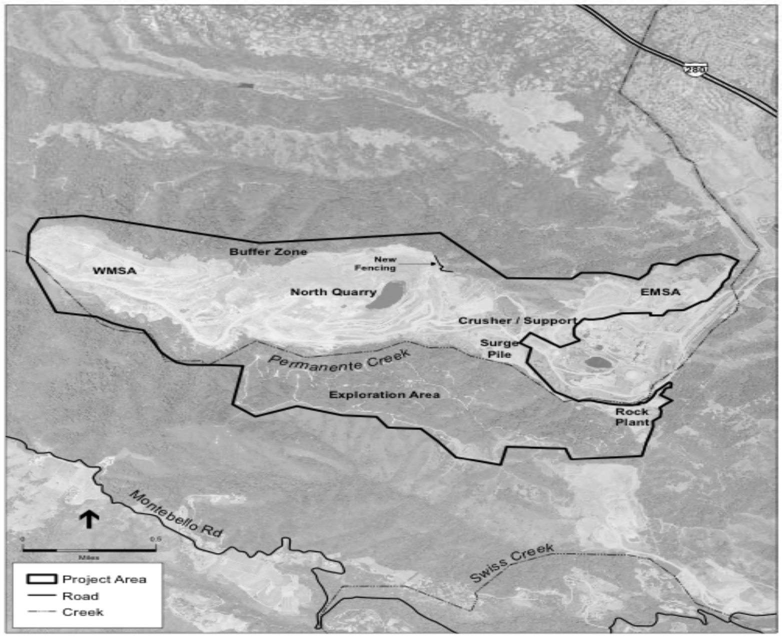
- Accept public comments regarding the analysis and/or findings of the Draft Environmental Impact Report prepared for proposed Lehigh Permanente Quarry Reclamation Plan Amendment.

Proposed Reclamation Plan Amendment

- Under state law (SMARA) a Reclamation Plan is required to reclaim mined lands to a beneficial end use.
- Proposal is to amend the current 1985 Reclamation Plan for surface mining (quarry) operations at Lehigh Permanente Quarry.
- The proposed Reclamation Plan Amendment includes approximately 1,239 acres,
  - 637 acres of existing or planned surface mining operation-related disturbance
  - 599 acres of open space areas.

Overview of Proposed Reclamation Plan Amendment

- Primary areas to be reclaimed consist of the following:
  - Quarry pit,
  - West Materials Storage Area (WMSA),
  - East Materials Storage Area (EMSA),
  - Surge Pile, Rock Plant,
  - Crusher/Quarry office support area,
  - Exploration area south of Permanente Creek,
  - Disturbed areas around and within the Permanente Creek corridor.



SOURCE: SOURCE: Lehigh, 2011; ESRI, 2011

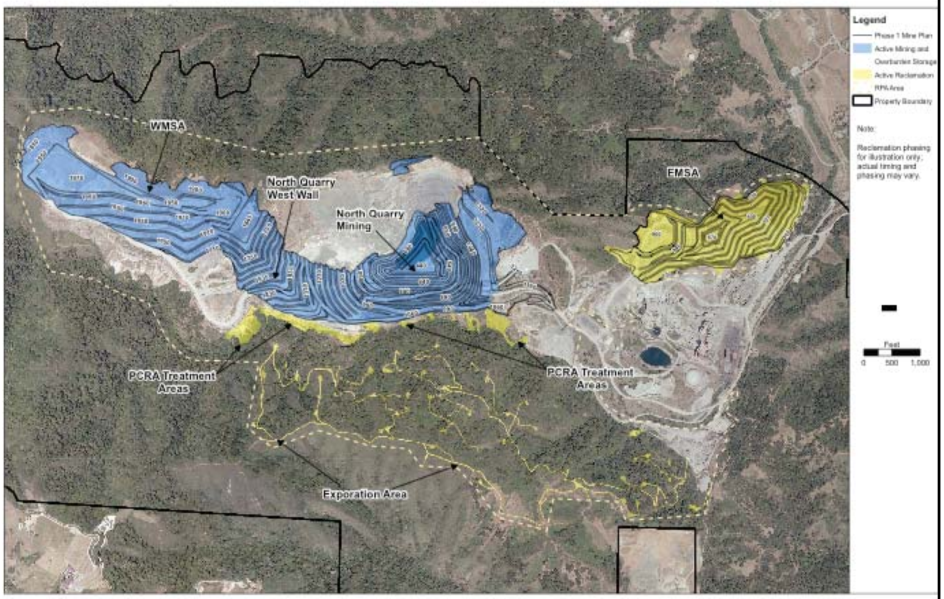
Lehigh Permanente Quarry Reclamation Plan Amendment. 211742

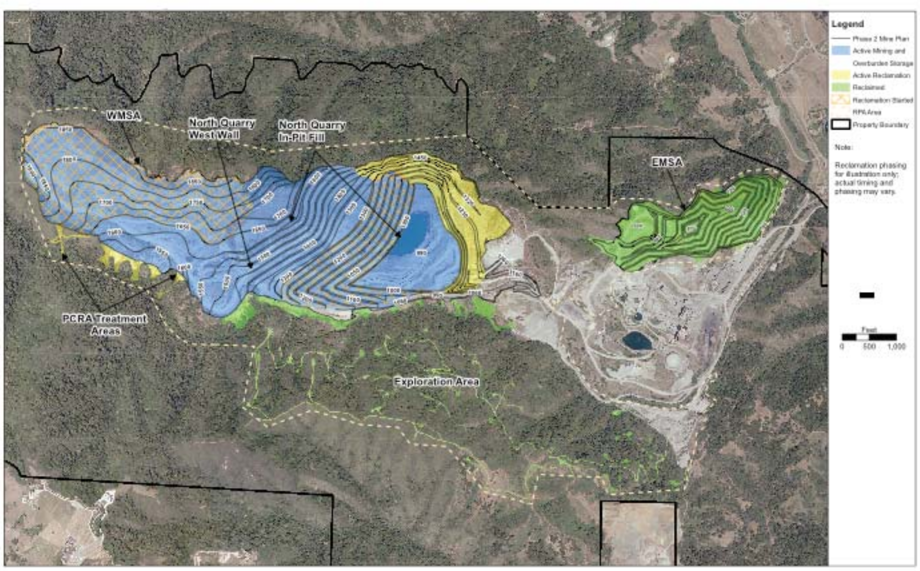
Figure 2-2

Project Area

Overview of Proposed Reclamation Plan Amendment

- Reclamation planned for a 20-year period in three phases.

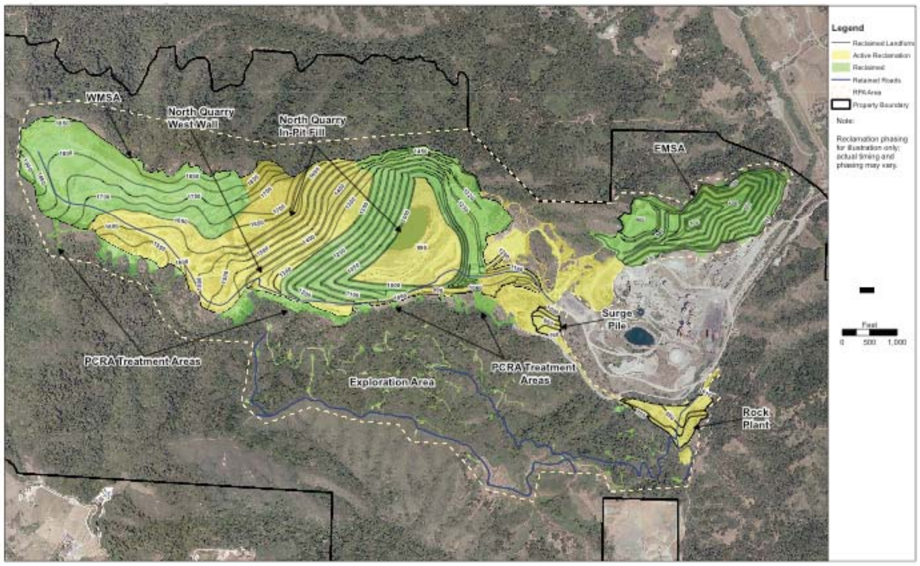




SOURCE: EnviroMine Inc., 2011

Lehigh Permanente Quarry Reclamation Plan Amendment. 211742

Figure 2-5
Reclamation Plan Amendment Phase 2



SOURCE: EnviroMine Inc., 2011

Lehigh Permanente Quarry Reclamation Plan Amendment. 211742

Figure 2-6
Reclamation Plan Amendment Phase 3
Final Reclamation

What Is An Environmental Impact Report (EIR)?

- Informational document to be used by the public and decision makers when making choices about a project.
- Identify significant environmental impacts
- Identify feasible mitigation measures & project alternatives for reducing or avoiding damages
- The term “significant impact” means substantial adverse damage to the physical environment.

Permanente Reclamation Plan EIR – Areas Addressed

- Aesthetics
- Agr. & Forest Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas
- Hazards
- Hydrology
- Land Use
- Mineral Resources
- Noise
- Pop/Housing

Contents of the Draft EIR

- Identifies feasible mitigation measures for significant impacts:
  - Noise / Health Hazards impacts during reclamation of EMSA area.
  - Water Quality (selenium) impacts following reclamation.
- Feasible Project Alternatives:
  - "No Project,"
  - Central Material Storage Area,
  - Complete Backfill of Quarry Pit.

Significant and Unavoidable Impacts

- Significant and unavoidable impacts are impacts that are unavoidable because no mitigation (or partial mitigation) is feasible. Draft EIR identifies the following :
  - Visual impacts during reclamation.
  - Adverse impacts to historic resources.
  - Contribution to concentrations of selenium in Permanente Creek during reclamation (Water Quality and Biological impacts).
  - Alteration of existing drainage pattern resulting in potential increased flooding.

Public Review Period EIR Comments

- Public Comment Period of 60 days - December 23, 2011 to **February 21, 2012.**

Locations to obtain EIR

- Cupertino, Los Altos, Saratoga Libraries
- County Planning Office
- County Planning Website / Download - *http://www.sccgov.org/portal/site/planning*

Submitting Comments

Today – Oral Comments

- Court Reporter – Transcription
- Video

Written Comments
Rob Eastwood, Santa Clara Planning Office County Government Center
70 W. Hedding Street, 7th Floor, East Wing, San Jose, CA 95110

email: **rob.eastwood@pln.sccgov.org**
Fax: (408) 288-9198

Next Steps

- Prepare Final EIR:
  - County will evaluate and prepare written responses to comments for inclusion in the final EIR.
  - Revisions to text of EIR (if necessary).
  - Mitigation Monitoring and Reporting Program.
- Planning Commission Hearing
  - Certify EIR,
  - Action on Reclamation Plan
  - Anticipated hearing date: March 22, 2012.

APPENDIX D

Overburden (Waste Rock) Characterization

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TABLE 6.9
Overburden (Waste Rock) and Ore Composite Samples - Drill Log Descriptions

Sample ID		Sample Number	Boring Number	Approximate Sample Depth (Feet)	General Rock Type	Drill Log Description	Total S (%)	Sulfide S (%)
Composite 5	Metabasalt	4-20A-08-49	4-20A-08	49	Metabasalt	METABASALT: 35.6-55.0 feet; medium dark gray to dark gray to greenish gray; very fine-grained; scattered layers of greenstone up to 0.5 feet thick, abundant milky quartz veins with some calcite; core is highly fractured; some poorly-developed slickensides.	0.12	<0.01
		4-23B-08-322	4-23B-08	322	Metabasalt	METABASALT: 257.5-384.0 feet; medium dark gray to dark gray to greenish gray; bands of greenstone to 1.0 feet thick; bands of vesicular metabasalt with milky calcite-filled vesicles up to 2.0 feet thick; abundant milky calcite; **scattered pyrite**; some poorly-developed slickensides; scattered bands of brownish gray limestone to 0.3 feet thick; bands of soft fault gouge up to 3.0 feet thick; some heavily sheared bands up to 3.0 feet thick; a few scattered bands of iron-rich metabasalt to 0.4 feet thick.		
		GT1-4-08-80	GT1-4-08	80	Metabasalt	METABASALT: 71.2-127.4 feet; medium dark gray to dark gray with thin bands of grayish green greenstone; very fine-grained; abundant calcite veins and calcite filled vugs (vesicles?); numerous zones of fault breccia up to 1.0 foot thick - fault breccia consists of soft, clayey, very fine-grained fault gouge with clasts of metabasalt and some greenstone up to 2.0 inches across; some white to light gray chert.		
		4-20A-08-343	4-20A-08	343	Metabasalt	FAULT BRECCIA: 325.4-345.6 feet; brownish gray to reddish brown to greenish gray; generally matrix supported with clasts up to 2.0 feet of hematite-rich metabasalt and greenstone; some well-developed slickensides; numerous milky calcite veins; **some pyrite**.		
		4-20A-08-348	4-20A-08	348	Metabasalt	METABASALT: 345.6-354.4 feet; medium dark gray to dark gray; highly sheared; thin bands of fault gouge up to 0.3 feet thick; some sheared greenstone.		
		4-24A-08-76	4-24A-08	76	Metabasalt	METABASALT: 75.1-88.6 feet; medium dark gray to pale reddish brown; reddish brown intervals are hematite-rich metabasalt; abundant milky calcite veins; thin (up to 4 inches) bands of fault gouge; some slickensides, **trace pyrite**.		
Composite 3	Fault Breccia	GT1-2-08-224	GT1-2-08	224	Undifferentiated Fault Breccia	FAULT BRECCIA: 221.4-225.8 feet; dark gray with grayish yellow greenstone.	1.41	0.92
		4-20A-08-345	4-20A-08	345	Undifferentiated Fault Breccia	FAULT BRECCIA: 325.4-345.6 feet; brownish gray to reddish brown to greenish gray; generally matrix supported with clasts up to 2.0 feet of hematite-rich metabasalt and greenstone; some well-developed slickensides; numerous milky calcite veins; **some pyrite**.		
		4-28A-08-115	4-28A-08	115	Undifferentiated Fault Breccia	FAULT BRECCIA: 101.0-136.8 feet; medium gray to medium dark gray; matrix supported, matrix composed of soft, clayey, very fine-grained fault gouge with clasts up to 1.0 inches across of metabasalt, greenstone, and some greywacke.		
Composite 4	Greenstone	4-27A-08-153	4-27A-08	153	Greenstone	FAULT BRECCIA: 146.2-199.0 feet; medium dark gray to dark gray; matrix supported, matrix composed of soft, clayey fault gouge, clasts up to 1.0 inches across of metabasalt, some hematite-rich metabasalt, and some greenstone; some clasts of milky calcite.	0.02	<0.01
		4-24A-08-74	4-24A-08	74	Greenstone	FAULT BRECCIA: 30.0-75.1 feet; dark yellowish orange to pale yellowish brown to medium gray to moderate greenish yellow; matrix supported, matrix composed of soft, clayey fault gouge with clasts up to 4 inches across of metabasalt, greywacke and greenstone with greenstone dominate from 73.4-75.1 feet; some very scattered milky calcite veins; some poorly- to well-developed slickensides; **trace amounts of pyrite**.		
		4-20A-08-429	4-20A-08	429	Greenstone	GREENSTONE: 414.0-433.6 feet; greenish gray; highly fractured; numerous milky calcite veins; highly fractured; bands of fault gouge up to 1.0 feet thick; well-developed slickensides; **some pyrite**; highly fractured.		
Composite 1	Graywacke	4-23B-08-245	4-23B-08	245	Graywacke	GRAYWACKE: 216.3-250.8 feet; medium gray to medium dark gray; very fine-grained; greenstone and metabasalt rock fragments to 2.0 mm; **scattered pyrite**; some milky calcite; a few bands of brownish gray limestone to 1.0 feet thick; a few poorly developed slickensides; core broken below 244.0 feet.	0.32	0.12
		4-20A-08-94	4-20A-08	94	Graywacke	GRAYWACKE: 79.0-104.0 feet; medium dark gray to dark gray with thin bands of greenish gray greenstone to 0.4 feet thick; numerous well developed slickensides coated with graphite; some milky calcite with minor quartz veining; highly fractured and sheared; core very broken; many fractures coated with moderate yellowish brown clay.		
Composite 2	Limestone and Dolomitic Limestone	4-20A-08-437	4-20A-08	437	Limestone	LIMESTONE: 433.6-443.2 feet; medium gray; micritic; some forams and microfossils; scattered black chert, chert content estimated at 1-3%; calcite veins, a few slickensides.	0.18	0.10
		4-27B-08-420	4-27B-08	420	Limestone	LIMESTONE: 406.1-466.9 feet; light gray to medium gray; micritic; numerous stylolites; numerous thin bands of black limestone; a few forams and other microfossils; **no visible pyrite**; very scattered milky calcite; scattered black chert nodules, chert content estimated at 3-5%; a few thin (<6 inches) bands of fault gouge; a few brecciated bands; strong reaction to 10% HCl.		
		4-34A-08-153	4-34A-08	153	Limestone	LIMESTONE: 153.7-174.2 feet; light gray; micritic; very abundant stylolites; some forams; **no visible pyrite**; bands of soft, clayey fault gouge to 0.3 feet thick; some thin fractures lined with light gray clay; some milky calcite veining; some dark gray to black chert nodules, chert content estimated at 5-8%; strong reaction to 10% HCl.		
		GT3-4-08-353	GT3-4-08	353	Limestone	LIMESTONE: 340.1-355.9 feet; brecciated and broken.		
GT1-2-08-213	Chert	GT1-2-08-213	GT1-2-08	213	Chert	CHERT: 212.8-221.4 feet; white, brecciated; some dolomitic limestone and medium gray chert clasts.	0.51	0.07

SOURCE: Golder Associates, Hydrologic Investigation, Permanente Quarry Reclamation Plan Update, Santa Clara County, California, May 2010, Rev. 1, November 2011.

TABLE 7

MINED MATERIALS AND OVERBURDEN LEACHABILITY

		Wall Washing Results						North Quarry (Water Sample)	Wall Runoff (WMSA Runoff Sample)
		Graywacke	Limestone - High Grade	Limestone - Medium to High	Limestone - high and med/low	Chert	Greenstone		
	Sample	GW-01	HG-01	MG-01	HMG-01	CT-01	GS-01		
	Date	11/24/09	11/24/09	11/24/09	11/24/09	11/24/09	11/24/09	01/13/10	01/13/10
	Age	> 5 years	> 5 years	2 months	1 year	< 1 month	< 1 month	NA	NA
Field Parameters									
pH	s.u.	6.94	7.87	7.53	7.32	7.53	8.95	7.94	7.9
Specific Conductance	µS/cm	283	137	42	46	78	94	NA	NA
Temperature	°C	18.6	16.43	13.78	11.91	17.35	18.36	NA	NA
Dissolved Oxygen	mg/L	6.57	7.42	7.95	16.5	8.03	7.4	NA	NA
ORP	mV	70	-32.7	11.4	25.1	92.8	73.7	NA	NA
Lab Parameters - Dissolved									
Aluminum	µg/L	1,800	220	59	220	1400	650	<38	<38
Antimony	µg/L	0.43	0.56	<0.17	0.18	<0.17	<0.17	8.2	0.86
Arsenic	µg/L	33	20	21	22	16	12	4.5	1.3
Barium	µg/L	150	79	83	180	520	660	41	24
Beryllium	µg/L	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18	<0.18
Boron	µg/L	28	19	14	24	52	52	69	31
Cadmium	µg/L	<0.13	0.2	<0.13	<0.13	<0.13	<0.13	0.53	<0.13
Chromium	µg/L	<0.55	0.81	<0.55	<0.55	3.6	2.6	<0.55	<0.55
Copper	µg/L	2.1	2.1	<0.68	0.86	<0.68	1.1	1.5	1.2
Iron	µg/L	720	130	11	160	1400	970	<9.3	<9.3
Lead	µg/L	0.29	0.063	<0.054	0.065	<0.054	<0.054	<0.054	<0.054
Manganese	µg/L	8.6	19	2.6	1.2	7.9	11	21	14
Mercury	µg/L	NA	NA	NA	NA	NA	NA	0.0107	NA
Molybdenum	µg/L	2.6	98	6.7	14	1.4	0.37	540	120
Nickel	µg/L	1.7	9.9	0.91	4.9	5.9	3.5	160	3.4
Selenium	µg/L	<0.38	49	14	0.7	<0.38	<0.38	82	29
Silver	µg/L	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065
Thallium	µg/L	0.22	<0.11	<0.11	<0.11	<0.11	<0.11	0.39	<0.11
Vanadium	µg/L	2.9	44	<1.2	6.3	7.3	39	400	2.6
Zinc	µg/L	7.5	23	3.6	16	6.6	5.8	120	28
Calcium	mg/L	7.8	46	31	34	17	21	210	160
Magnesium	mg/L	6.1	1.7	2.2	2.6	6.6	3.1	36	42
Sodium	mg/L	4.2	1.6	1.2	2.3	6.1	7.3	22	24
Potassium	mg/L	1.2	0.43	0.21	0.85	1.8	0.86	0.85	2
Lab Parameters - Total Recoverable									
Aluminum	µg/L	77,000	40,000	28,000	1,800,000	960,000	990,000	720	87,000
Antimony	µg/L	<4.0	7.7	6.8	<20	<4.0	<4.0	7.9	1.6
Arsenic	µg/L	80	88	81	290	<22	<22	3.7	21
Barium	µg/L	2,800	7,900	13,000	140,000	12,000	23,000	59	4,200
Beryllium	µg/L	6.7	<4.0	<4.0	92	36	30	<0.20	1.1
Boron	µg/L	33	36	86	650	160	230	70	52
Cadmium	µg/L	14	45	6.6	680	5.7	5.1	1.3	5.8
Chromium	µg/L	120	490	63	4,500	7,000	7,100	6	370
Copper	µg/L	160	420	370	17,000	2,000	3,100	3.3	170
Iron	µg/L	100,000	83,000	69,000	2,400,000	1,100,000	940,000	1,200	160,000
Lead	µg/L	130	25	43	1,300	27	15	0.5	17
Manganese	µg/L	3,000	2,000	7,200	56,000	22,000	44,000	38	3,000
Mercury	µg/L	0.032	<0.016	<0.016	0.032	<0.016	<0.016	<0.016	1.5
Molybdenum	µg/L	16	320	23	<23	<4.6	<4.6	630	140
Nickel	µg/L	210	1,300	1,100	150,000	9,300	5,800	180	460
Selenium	µg/L	<11	230	60	160	<11	<11	73	33
Silver	µg/L	2	5.4	3.4	<8.8	<1.8	<1.8	<0.088	0.89
Thallium	µg/L	<2.2	4.3	<2.2	57	<2.2	<2.2	0.24	0.79
Vanadium	µg/L	230	960	220	2100	<100	<52	430	350
Zinc	µg/L	460	3,300	700	390,000	2,800	2,100	140	600

TABLE 7

MINED MATERIALS AND OVERBURDEN LEACHABILITY

		Wall Washing Results						North Quarry (Water Sample)	Wall Runoff (WMSA Runoff Sample)
		Graywacke	Limestone - High Grade	Limestone - Medium to High	Limestone - high and med/low	Chert	Greenstone		
Calcium	mq/L	180	1,000	3,100	33,000	2,300	1,500	230	1,000
Magnesium	mq/L	44	67	68	1,700	1,600	1,700	40	160
Sodium	mq/L	4.2	3.6	3.9	8.5	5.4	5.6	23	25
Potassium	mg/L	13	4.1	4	64	14	4.2	1.0	8.2
General Chemistry									
Ammonia as N	mg/L	0.22	0.038	0.025	0.16	0.84	4.9	<0.025	0.095
Bicarbonate	mg/L	50	25	24	41	68	57	200	71
Carbonate	mg/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0
Chloride	mg/L	1.3	0.95	0.97	1.4	1.3	0.44	13	25
Electrical Conductivity	µmhos/cm	101	259	199	222	135	160	1,130	1,090
Fluoride	mg/L	1.3	0.34	0.46	0.86	2.4	1.2	0.14	0.22
Hardness (as $CaCO_3$)	mg/L	45	120	86	96	69	64	673	580
Nitrate as N	mg/L-N	0.31	0.28	1.4	12	0.49	6.7	0.73	7.6
Nitrite as N	mg/L-N	0.015	0.012	<0.0081	<0.0081	0.049	0.12	<0.0081	<0.0081
pH	s.u.	7.89	8.06	7.95	8.09	8.16	8.24	7.94	7.90
Sulfate	mg/L	4.9	100	61	15	2.6	3.3	550	550
Total Alkalinity (as $CaCO_3$)	mg/L	41	20	20	33	56	47	170	58
Total Dissolved Solids	mg/L	61	110	65	91	67	100	790	900
Total Phosphorus	mg/L	2.2	4.1	3.7	140	91	100	<0.016	1.8
Total Suspended Solids	mg/L	3,400	540	4,800	68,000	35,000	50,000	18	3,600
Turbidity	NT Units	1,600	850	2,500	44,000	28,000	23,000	NA	NA

SOURCE: Strategic Engineering & Science, Inc. (SES), Reclamation Water Quality, Permanente Quarry, Santa Clara County, California, December 2011.

APPENDIX E

Financial Assurances Cost Estimate (FACE), January 2012

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Interim Financial Assurance Cost Estimate

for

Permanente Quarry

State Mine ID # 91-43-0004

Submitted to:

Santa Clara County

Prepared for:

Prepared by:

EnviroMINE Inc.

3511 Camino Del Rio South, Suite 403
San Diego, CA 92108
(619) 284-8515, Fax (619) 284-0115

January 23, 2012

1.0 INTRODUCTION

1.1 Purpose

Under the California Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code Section 2719 *et seq.*), all surface mining operations are required to have an annually updated financial assurance estimate (FACE) approved by their Lead Agency, reflecting the cost of reclaiming the site. For purposes of this estimate, Santa Clara County is recognized as a Lead Agency through the adoption of local Zoning Ordinance, Title 8, Chapter 88-11, as certified SMARA compliant by the State of California.

1.2 Location

Permanente Quarry (Quarry) is a limestone and aggregate mining operation located in the unincorporated foothills of Santa Clara County west of the city of Cupertino. The Quarry is situated approximately 3.0 miles southwest of the intersection of Interstate 280 and Highway 85. Site access is provided via Stevens Creek Boulevard and Foothill Expressway, continuing to the western terminus of Permanente Road.

1.3 Background

Limestone quarrying operations started at this site prior to the County's implementation of zoning in the area, thus making the mine a vested operation. SMARA requires all mine operators, including those with vested rights, to prepare a Reclamation Plan. The County approved the current reclamation for the Quarry (Reclamation Plan) in March 1985. The Reclamation Plan encompasses 330 acres, representing some areas that in 1985 supported active mining and material stockpiling. The Reclamation Plan did not encompass all mining disturbance present in 1985, including certain rock processing facilities, access roads and material storage sites. The inclusion or omission of such features was generally consistent with how SMARA's requirements were interpreted at that time. A Reclamation Plan Amendment (RPA) was provided to the County of Santa Clara that provides reclamation standards and strategies for lands impacted by the mining operation. Currently the RPA is being processed by the County and is in the approval process. This estimate is an interim FACE that will be bonded for while the RPA is in the approval process. Once the RPA is approved a final FACE will be drafted and bonded for.

Current operations at the site include a quarry face with a series of benches and multiple material storage areas. The overall slope gradient of the benched quarry face is to be 1H:1V (horizontal:vertical), while the overburden fill slopes will be reclaimed at a maximum overall slope inclination between 2.5H:1V to 2.6H:1V. Reclamation at the Quarry is conducted on an annual basis for areas at final grade and not subject to further disturbance.

The majority of the quarry site is found in a fully disturbed condition with little evidence of vegetative cover. An exception to this includes areas where reclamation has begun or areas that have naturally revegetated. Vegetation types within the quarry area include ruderal slopes, oak, chaparral and disturbed lands. The proposed end use for the quarry after reclamation is complete is open space.

This FACE addresses all disturbed lands at the Quarry and reclamation costs are based off the RPA submittal. Items at the Quarry outside the 1985 Reclamation Plan, that are addressed in the RPA and incorporated in this FACE include: EMSA reclamation, backfilling the Main Pit to buttress past instabilities, Permanente Creek restoration, reclaiming the exploration areas on the south side of Permanente Creek, reclaiming the rock plant site and other mining related disturbance. In total, approximately 600 acres are currently disturbed at the Quarry.

Lehigh Southwest Cement Company, Inc. currently operates the mine and assumed the associated liability of reclaiming the site after the cessation of mining.

1.4 Methodology

This estimate utilizes the following resources:

- Reclamation Plan Amendment (RPA)
- Existing geotechnical reports and studies
- Means Site Work & Landscape Cost Data
- Department of Industrial Relations, Prevailing Wage Determinations
- Caltrans, Labor Surcharge & Equipment Rental Rates (4/1/11-3/31/12)
- Caterpillar Handbook, Edition 37
- Cost Estimate from Freeduln Hydroseeding
- Conveyor equipment cost from Aggregate Machinery Specialists
- Interviews with Lehigh personnel
- Pacific Coast and S&S Seed Companies
- Personal experience of the estimator

This reclamation estimate provides anticipated costs for direct and indirect expenses that would be faced by the responsible party. Based on the requirements of the approved reclamation plan and restoration of areas outside the Reclamation Plan boundary, the following elements represent the direct costs of reclamation:

1. Removal of equipment, disposal of structures, and disposal of miscellaneous rubbish
2. Site grading
3. Backfilling the Main Pit
4. Revegetation
5. Revegetation Monitoring and Maintenance

The following elements represent the indirect costs of reclamation:

1. Supervision
2. Profit and Overhead
3. Contingencies
4. Mobilization

Taken together, the Direct and Indirect reclamation costs identify the total cost for reclamation. Finally, Lead Agency administrative costs (2%) are added to the total cost of reclamation to determine the overall financial assurance requirement.

2.0 ESTIMATED DIRECT COST OF RECLAMATION

2.1 Removal of Processing Plant and Equipment

Plant removal involves demolishing and transporting the Rock Plant including conveyors, crushers, screens, wash plants, scales, and miscellaneous structures to an offsite location. This also includes the removal of the overland conveyor that extends from the Main Pit to the Cement Plant. In addition to demolition and removal of these structures, all foundations must be demolished and removed, and compacted surfaces must be ripped to prepare the site for revegetation. Valley Center Recycling is located 13 miles from the site and accepts scrap at no charge to the delivering party.

Overland Conveyors:

Mined rock is hauled from the Main Pit to the primary crusher located on the south side of the Main Pit. This material is crushed and transported to the cement plant and/or rock plant via an overland conveyor. The overland conveyor extends for a distance of approximately 8,900 feet and includes transfer points, secondary crushing, interim stockpiles and a tunnel. Removal of the overland conveyor will require demolition of the steel structures and foundations, removal of conveyor belts and loading onto trucks for delivery to a salvage yard. Cleanup of miscellaneous rubbish and preparation of access roads for revegetation will be the final steps in this process.

This task involves a CAT 330 Hydraulic Excavator, with a La Bounty Shear attachment, and CAT 330 Hydraulic Excavator, with a grappling attachment, to cut and load manageable sized sections onto an over-the-road truck to haul to a scrap yard.

Also included in this task would be the removal of conveyor belting, electrical panels and associated wiring. Although the steel, electrical components, and conveyor belting have substantial value, no salvage value has been assumed.

Equipment	Each	Rate	Hours	Total
Cat 330 w/ Steel Shear	1	$214.41	45	$9,648
Cat 330 w/ Grapple	1	$160.03	60	$9,602
Cat 966 E Front-End Loader	1	$120.93	60	$7,256
Cat 330 w/ Breaker	1	$161.59	24	$3,878
Grove RT-635 40t Crane	1	$80.76	60	$4,846
Truck w/low bed trailer	1	$93.33	70	$6,533
Truck w/Semi-End Dump	1	$73.56	36	$2,648
Welding Truck	1	$52.43	60	$3,146
Pick up	2	$17.10	120	$2,052
Total Equipment Cost				**$49,609**

Labor	Each	Rate	Hours	Total
Excavator Operator	3	$63.56	129	$8,199
Loader Operator	1	$62.00	60	$3,720
Crane Operator	1	$60.34	60	$3,620
Low Bed Driver	1	$49.25	70	$3,448
Semi-End Dump Driver	1	$48.90	36	$1,760
Welder	2	$44.88	120	$5,386
Laborer	2	$43.93	120	$5,272
Foreman	1	$63.56	60	$3,814
Total Labor Cost				**$35,219**

Miscellaneous Expense	Each	Rate	Total
Haul away Trash Containers	5	$575	**$2,875**

Rock Plant Removal:

The rock plant is a fully integrated rock processing facility.. Equipment at the processing plant includes:

- Approximately 3,400’ of conveyors with attendant structural supports
- Approximately 7,000’ of 36” conveyor belting
- Maintenance, control, and office buildings (approximately 18,000 square feet)
- 1,700 l.f. of conveyor tunnel
- 6 bag houses
- 850,000-gallon water tank
- 10,000-gallon water tank
- 4,000-gallon water tank
- 2,000-gallon above ground diesel tank
- Miscellaneous Electrical Panels
- 2 crushers
- 7 vibrating screens
- 35,000 s.f. of concrete foundations (assume 12” thickness)
- 4,500 l.f. of 2” water mains.
- 2 truck scales
- 2 belt presses
- 4 compressors
- Office and storage trailers
- Sand Screw

Removal of the rock plant will be accomplished in similar fashion to removal of the overland conveyor. The steel structures will be cut into manageable pieces with an excavator mounted with a steel shear, with pieces placed on an over-the-road truck for removal to a scrap yard. However, the processing plant also includes screens, crushers, wash plant, and buildings, and scales. This equipment will be dismantled in the most efficient manner possible, which may include shearing and cutting using a cutting torch, or simply unbolting the equipment from the support structures prior to demolition. Five (5) separate tunnels of approximately 1,700’ in length connect the various surge piles with different processing circuits. These tunnels will need to be excavated to remove the corrugated culvert pipe supports.

Concrete foundations will be demolished using a rock breaker attachment on an excavator and a front end loader. Demolished concrete materials will be transported to the main pit for disposal.

Salvageable equipment such as, screens, crushers, wash plant, scales, and moveable trailers will be relocated to an equipment salvage dealer for resale. No salvage value is assigned for resale of this equipment.

Equipment	Each	Rate	Hours	Total
Cat 330 w/ Steel Shear*	1	$214.41	48	$10,292
Cat 330 w/ Grapple*	1	$160.03	48	$7,681
Cat 966 E Front-End Loader	1	$120.93	48	$5,805
Cat 330 w/ Breaker*	1	$161.59	80	$12,927
Cat 320 w/2.2 cy bucket	1	$84.83	40	$3,393
Grove RT-635 40t Crane	1	$80.76	48	$3,876
Truck w/low bed trailer	1	$93.33	48	$4,480
Truck w/Semi-End Dump	1	$73.56	48	$3,531
Welding Truck	1	$52.43	60	$3,146
Pick up	2	$17.10	80	$1,368
Total Equipment Cost				**$56,499**

Labor	Each	Rate	Hours	Total
Excavator Operator	4	$63.56	216	$13,729
Loader Operator	1	$62.00	48	$2,976
Crane Operator	1	$60.34	48	$2,896
Low Bed Driver	1	$49.25	48	$2,364
Semi-End Dump Driver	1	$48.90	48	$2,347
Welder	2	$44.88	120	$5,386
Laborer	2	$43.93	96	$4,217
Foreman	1	$63.56	80	$5,085
Total Labor Cost				**$39,000**

Miscellaneous Expense	Each	Rate	Total
Haulaway Trash Containers	10	$575	**$5,750**

Concrete Culvert Removal from Permanente Creek

Removing a concrete half culvert located in the proposed restored stream channel is one aspect of the Permanente Creek Restoration. The concrete half culvert is located just downstream from Pond 13 and covers a length of approximately 375 feet. It is estimated that approximately 130 cubic yards of concrete will need to be demolished and removed to complete removing the concrete half culvert.

According to the CAT Handbook, an H120c hydraulic hammer attached to a 315L excavator can demolish approximately 230 cubic yards of reinforced concrete within 8 hours. Once the concrete has been broken into pieces that are 2-feet in diameter or smaller, the excavator will be used to load the material into haul trucks. According to the CAT handbook, the 315L has an average cycle time of 20 seconds. Assuming that the average bucket load will be 0.75 yd^3, it will take one (1) hours for the excavator to load 130 yd^3 into the trucks. It is estimated that each truckload will have a capacity of 17 yd^3 and each load will take approximately 1.5 hours to complete. All concrete removed from the site will be hauled off site to a C and D Recycling facility. Additional time has been added to this time to account for truck warm-up and mobilization. The table below represents a cost estimate for demolishing and removing all footings and foundations on the site.

Task	No.	Rate	Hours	Total
315L Excavator w/ Rock Breaker Attachment	1	$89.23	6	$535
Excavator Operator	1	$59.61	6	$358
315L Excavator w/ bucket	1	$55.90	2	$112
Excavator Operator	1	$59.61	2	$119
Haul Truck	4	$73.56	12	$883
Truck Driver	4	$48.90	12	$587
Foreman	1	$59.61	8	$477
Laborer	2	$43.93	8	$351
Pick Up	1	$17.10	8	$137
Concrete Recycling Fees*				$640
Total Cost of Removing Concrete Culvert				**$4,199**

** Concrete Recycling fees of $80 per load were obtained from Hanson Aggregates*

Mobile Equipment Removal:

Aside from the processing plant facilities, other equipment used at the site includes the following:

- 7 CAT 988 Wheel Loaders
- 1 CAT 824C Wheel Tractor
- 2 CAT 992 Wheel Loaders
- 1 CAT 216 Skid Steer
- 1 CAT 16G Motor Grader
- 1 Kenworth WA-900 Dump Truck
- 1 Link-Belt LS5800 Excavator
- 2 CAT D10T Bulldozers
- 1 CAT D10R Bulldozer
- 1 CAT 777C Mining Truck
- 3 CAT 777D Mining Trucks
- 3 CAT 740 Mining Trucks
- 4 CAT 785B Mining Trucks
- 1 Ingersoll-Rand DM50 Drill
- 1 Driltech DK45 Drill
- 1 Miller 600D Welder
- 9 Allmand 695 Lite portable light towers
- 1 Lincoln Welder
- 1 Guzzler Sump Pump
- 1 CAT 733B Mining Truck
- 2 Water Trucks

It is assumed that all of the equipment in the preceding list is in good repair and can be loaded directly onto a lowboy trailer and removed from the site. For purposes of this estimate, it is assumed that each piece of equipment will require 0.5 hour for loading, 1.0 hour to haul to a resale dealer in the San Jose area, including unloading, and 0.5 hour to return to the site. Approximately two (2) hours will be required to remove each piece of equipment from the site. At this time there are 45 pieces of equipment that must be removed from the site, 36 of which will require special treatment as wide loads (3 require double wide-loads). Estimated costs for equipment removal are shown below.

Cost Item	Quantity	Hours	Rate	Total
Trucking w/ Tractor and Lowboy Trailer (including operator)	6	12	$142.58	$1,711
Trucking w/ Tractor, 5-axle Lowboy Trailer & 2 pilot vehicles (including operators)	39	lump sum	$2,500	$97,500
Total Heavy Equipment Removal Cost				**$99,211**

Note: trucking costs include truck, trailer and driver.

Total Cost for Removal of Plant Facilities and Heavy Equipment $292,362

2.2 Site Reclamation

Site grading will stabilize slopes and prepare the site for revegetation in accordance with the 2011 RPA. This estimate's restoration scenario incorporates backfilling of the Main Pit to buttress past instabilities. To accomplish this, the West Materials Storage Area (WMSA) will be used as the primary source of backfill material, since mining byproducts (unused mined material) will not be available.

2.2.1 Backfilling of the North Quarry

Backfilling the North Quarry will involve transporting and placing fill materials. Based off current site conditions, Chang Consulting estimates that approximately 28,500,000 Cubic Yards (CY) of material is required to backfill the North Quarry to the elevations identified in the RPA. Total backfilling volumes were estimated by comparing current existing topographic data and the proposed reclamation contours identified in the RPA. Ample volumes of backfill currently exist at the West Material Storage Area (WMSA). A conveyor will be utilized to transport approximately 28,500,000 CY of backfill material from the WMSA to the North Quarry.

The conveyor system will place material directly into the pit. To increase efficiency of the conveying system, portable conveyors will be moved around the WMSA as backfilling progresses. Two D 10 dozers will push overburden into a dozer trap that will feed the conveyor system. Oversized material will be reduced by a jaw crusher to six (6) inch minus prior to loading onto the conveyor. A D10 dozer will be utilized within the North Quarry to spread conveyed materials in the backfill area. Backfilling of the North Quarry will take approximately five (5) years, working two shifts per day, five days per week, on a year round basis.

<u>Conveying Backfill Material:</u>

To relocate approximately 28,500,000 CY of overburden from the WMSA to the North Quarry a conveyor system will be utilized. Material will be pushed directly from the WMSA into a feeder and onto the conveyor system. Oversized material will be reduced by a jaw crusher to six (6) inch minus prior to loading onto the conveyor.

Backfilling of the North Quarry will also include grading of approximately 6,700,000 CY of non-limestone material that has been identified as the "Main Slide". Materials originating from the Main Slide will be removed using a bull dozer. As the backfill elevation increases in the pit, Main Slide materials will be joined with this material. This will reduce push distances and allow a single dozer to complete removal of the Main Slide.

To optimize production from the dozers the conveyor system will be relocated as grading progresses; average push distances will be kept at approximately 300 feet. Throughout the backfilling operation, sections of conveyor will be relocated to reduce the need for additional conveyor to access all areas of the WMSA. During each phase of backfilling only one collection point for the dozers to push material to will be utilized. The system will be capable of shipping approximately 1,380 CY per hour over the conveyor. All equipment required to convey material from the WMSA to the North Quarry is included in the cost estimate from Aggregate Machinery Specialists included in Attachment 2. Generally the conveyor system is composed of three separate parts:

- Primary
- Conveyor
- Radial Stacker

The first equipment discussed in the proposal is the primary station, which includes a heavy duty 38" by 62" jaw crusher and a 62" by 42" vibrating grizzly feeder. The crusher and feeder come with all the add-ons necessary to operate the systems. The conveyor identified for the project is made up of four (4) 42" by 2,375' ground line channel conveyors. The conveyors come with all the belting, motors, pulleys and guards to operate the system. The last piece of equipment required to complete the conveyor system is the Radial Stacker. The stacker is a 30" by 190' portable TeleStacker conveyor, costs for the radial stacker include all accessories recommended in the quote provided in Attachment 2.

In addition to purchasing the system and installing it at the site there will be operation and maintenance costs to run the system while the backfill material is transported from the WMSA to the North Quarry. Costs for operation and maintenance have been included in the table below. These costs include all replacement parts and labor to operate the system over the approximate five (5) year period required to complete backfilling. It is assumed that the conveyor system will generate approximately 75% of the power to operate the conveyor . Electrical power costs are included to address expected operating costs.

At the North Quarry once material is shipped over the conveyor system and generally distributed in the pit by the Radial Stacker, a D11 dozer will push material around the dump site for final placement. The dozer will only be required to push approximately 1/4 of the material around the North Quarry because the Radial Stacker will distribute the majority of the backfill material. Costs in the table below include purchasing and operating the conveyor system as well as all mobile equipment and labor required to complete the backfilling operation. A detailed quote for the conveyor system machinery was provided by Aggregate Machinery Specialist and can be found in Attachment 2.

Equipment	Each	Rate	Hours	Total
42" Conveyor System Over 10,000'	N/A	LS	N/A	$6,916,140
Cat D10N Dozers	3	$281.00	62,400	$17,534,400
Cat D 11 Dozer	1	$441.31	7,500	$3,309,825
Water Truck	1	$36.77	6,700	$246,359
D 10 Dozer Operators	3	$59.61	62,400	$3,719,664
D 11 Dozer Operator	1	$59.61	7,500	$447,075
Water Truck Driver	1	$48.60	6,700	$325,620
Conveyor Operation/Maintenance	L.S./ Hour	$41.23	20,800	$857,584
Electricity	187 Kwh	$22.38	20,800	$465,504
Total Backfilling Costs				**$33,356,667**

Prior to operation of the conveyor system it will need to be installed at the site. Costs for initial installation of the conveyor and accessory equipment are included in the table below. Costs for removing the conveyor system are included in mobilization.

Equipment	Each	Rate	Hours	Total
Grove RT 525 Crane	1	$62.86	200	$12,572
Cat 938 G Loader	1	$86.95	200	$17,390
Cat 315L Excavator	1	$55.90	200	$11,180
Crane Operator	1	$60.34	200	$12,068
Pickup Truck	2	$17.10	200	$6,840
Excavator Operator	1	$59.61	200	$11,922
Loader Operator	1	$57.80	200	$11,560
Foreman	1	$60.34	200	$12,068
Laborers	2	43.93	200	$17,572
Total Conveyor Installation Costs				**$113,172**

During operation of the conveyor system sections of the conveyor will need to be relocated as grading progress through the WMSA. Relocating the conveyor system will take approximately eight (8) hours to complete. Throughout the operation it is anticipated that relocating the system will need to be done about 10 times. Costs in the table below include all equipment and labor necessary to relocate sections of the portable conveyor.

Equipment	Each	Rate	Hours	Total
Cat 325L Excavator	1	$102.01	80	$8,161
Cat 988 Loader	1	$172.64	80	$13,811
Excavator Operator	1	$59.61	80	$4,769
Loader Operator	1	$59.61	80	$4,769
Laborers	2	$43.93	160	$7,029
Total Conveyor Relocation Costs				**$38,539**

Water is necessary for dust suppression for the pit back fill operations. The water will service the conveyor system and haul road dust suppression needs.

Water is currently available at the existing crusher/conveyor. Extension of water to the backfill conveyor will require digging a trench and running a 4" water main, including pipe bedding over a 6,000' distance within the existing haul road that extends between the crusher and the west materials storage area. Means Site Work and Landscape Cost Data, 2012 was used to estimate these costs.

Activity	Distance	$/foot	Total
Water Line Construction	6,000	$12.35	$74,100

Electrical power must be provided to power the conveyor system used to backfill the pit. Although the conveyor system will generate up to 75% of total power requirements, some power will be necessary for start up and continuous operations.

Electrical power will be extended from the crusher/conveyor system used to transport materials from the pit to the cement and aggregate plants. This will require an extension of electrical lines for approximately 5,800 feet to the backfill conveyor system. It is assumed that the power poles can be spaced at 300' intervals. Over the 5,800' distance, 20 power poles will be necessary. The cost for extending power is estimated using Means Site Work and Landscape Cost Data, 2012. Power line extension is estimated on a "per pole" basis and includes all poles and wiring.

Activity	Poles	$/Pole	Total
Power Line Construction	20	$1,975	$39,500

Total Backfilling Costs $33,621,978

2.2.3 Adding Organic Material to Backfilling

As recommended in the Attachment G -SES Reclamation Water Quality Report of the RPA, backfill is to be amended with organic matter while it is being placed in the North Quarry. It is estimated that approximately 63,000 tons of organic matter will be required to be mixed into the backfill material at the North Quarry. The source of the organic matter is to be from a off-site source. This estimate assumes that these materials would originate from an organic material from a supplier in Gilroy, Ca.

The organic material would be mixed into the backfill material during filling of the upper zones of the quarry within the pit; i.e., starting at elevation 935 to 960 ft amsl and up to approximately 985 ft amsl. Groundwater in the quarry is expected to stabilize at an elevation of between 985 and 990 ft amsl. The addition of organic material will take approximately three years and will occur during the placement of the final 25 to 50 feet of fill in the quarry area near the end of Phase 2. Trucks will deliver the material to the WMSA near the hopper for the portable conveyor system and a loader will feed the material into the hopper. Once loaded into the hopper the material will travel along the portable conveyor system to be transported to the North Quarry. Utilizing the conveyor system will allow for even mixing of the backfill material and the organic material.

Equipment	Each	Rate	Hours	Total
Cat 980F Loader	1	$159.54	220	$35,099
Loader Operator	1	$59.61	220	$13,114
Organic Material*	63,000 (Tons)	$30.00	N/A	$1,890,000
Total Conveyor Relocation Costs				**$1,938,213**

**Costs for organic material include delivery*

2.2.4 Capping Site With Non-Limestone Material

Measures to protect surface water quality during reclamation activities consist of isolating runoff from limestone materials in the North Quarry backfill, WMSA, and EMSA. This will be accomplished during reclamation construction by covering reclaimed areas, and by construction of an effective surface drainage system. The recommended cover includes the placement of a 1-foot thick layer of run-of-mine non-limestone rock (i.e., greywacke, chert, and greenstone) over areas where limestone materials are used as general fill for reclamation. These areas are limited to 440 acres of the site and include the WMSA, EMSA and the North Quarry. The total area to receive capping material accounted for in the FACE is a conservative estimate and accounts for capping all surfaces within the WMSA, EMSA and North Quarry. Field investigation and testing performed by a geologist in the field will determine areas of the site to be capped with non-limestone material during reclamation. The FACE assumes costs for capping the entire 440 acres, even though capping may not be required over the entire 440 acre area.

Preliminary analysis indicates that the WMSA has ample quantities of non-limestone material, which will meet the required 710,000 CY needed for capping. Drill borings and geologic investigation of the WMSA estimate that approximately 80% of the material in the WMSA is non-limestone material that is suitable for use as capping material. Stockpiled in the WMSA and ready for use as capping material, the non-limestone material will be identified by a geologist during backfilling and utilized for capping material. No additional processing or stockpiling of the material is required prior to use as capping material. Costs for finish grading of non-limestone capping material are accounted for in Section 2.2.7 Finish Reclamation.

Distribution of non-limestone material for capping will utilize a variety of equipment. A combination of dozers, scrapers, loaders and off-road haul trucks will be utilized to distribute the non-limestone capping material. Three separate areas require capping material and three separate equipment combinations will be utilized in order to maximize the efficiency of the equipment.

East Material Storage Area (EMSA) :

Material required for the EMSA is approximately 120,000 CY of non-limestone material. This material will be transported from the WMSA to the EMSA using 777D haul trucks. The average haul distance is approximately 12,000 feet one way. Material will be loaded into off-road haul trucks by a Cat 992 loader and transported to the EMSA for placement. Below are production estimates and assumptions utilized for the cost estimate:

Loaded-3.8 Min @ an average grade of -4%
Empty-3.8 Min @ an average grade of 4%
Total Travel Time-7.6
Loading and unloading-4.1 min
Loads/Hour- 5.1
Truck Capacity-72 CY
Production Per Truck Per Hour- 367 CY
Total Time Required- 327 Hours

North Quarry:

Material required for the North Quarry is approximately 361,000 CY of non-limestone material. This material will be transported from the WMSA to the EMSA using 777D haul trucks. The average haul distance is approximately 4,000 feet one way. Material will be loaded into off-road haul trucks by a Cat 992 loader and transported to the

North Quarry for placement. Production estimates and assumptions utilized for the cost estimate are listed below:

Loaded-1.4 Min @ an average grade of -4%
Empty-1.4 Min @ an average grade of 4%
Total Travel Time-2.8
Loading and unloading-4.1 min
Loads/Hour- 8.7
Truck Capacity-72 CY
Production Per Truck Per Hour- 626 CY
Total Time Required- 577 Hours

<u>West Material Storage Area (WMSA):</u>

Material required for the WMSA is approximately 229,000 CY of non-limestone material. This material will be distributed around the WMSA using Cat 651 scrapers. Scrapers are self-loading machines and do not require a loader, however a dozer is required as a push cat to assist in loading and unloading of the scrapers. The average haul distance is approximately 1,400 feet one way. Below are production estimates and assumptions utilized for the cost estimate:

Fixed Time	
Load Time	.6 min
Spread Time	.7 min
Total	1.3 min

Cat 651E Scraper Production Rates	Avg (ft) Distance	Avg Grade (%)	Avg Time (min)	Round Trip Time (min)	Total Trip Time (min)	Trips per Hour
Site Average Loaded	1,400	4	1.1	2.9	4.2	14.2
Site Average Empty	1,400	4	.8			

Cat 651E Scraper Operational Logistics	Trips/Hour	651E Capacity (struck)	CY/Hr	CY Total	Hours Required
Logistics	14.2	32 cy	454	229,000	**505**

All labor and equipment costs for distributing non-limestone capping material are included in the table below:

Equipment	Each	Rate	Hours	Total
Cat 992B Loader	2	$269.91	658	$177,601
Cat 777 Haul Truck	3	$234.11	987	$231,067
Cat 651 B Scraper	4	$248.09	505	$125,285
Cat D 10N Dozer	2	$280.85	253	$71,055
Water Truck	1	$36.77	456	$16,767
Loader Operator	2	$59.61	658	$39,223
Off-Road Haul Truck Driver	3	$49.25	987	$48,610
Scraper Operator	4	$58.23	505	$29,406
Dozer Operator	2	$59.61	253	$15,081
Water Truck Driver	1	$48.60	456	$22,162
Total Non-Limestone Material Capping Costs				**$776,257**

2.2.5 Permanente Creek Restoration Grading

The reclamation plan calls for restoration of about 2,500 linear feet of Permanente Creek. Material from historic mining has collected in the creek channel. The reclamation plan calls for removal of this material and creation of a reconfigured creek channel that is roughly 50 feet wide with a 10 foot bottom and 3:1 side slopes. Material removed from the creek during the reconstruction of the channel will be hauled to the North Quarry and utilized as backfill material. In total there is an estimated 17,500 Cubic Yards of material that will be removed from the channel to create the reconfigured channel. Costs in the table below include all grading to reconstruct the channel, as well as the installation of step pools.

Task	Each	Hours	Rate	Total
Cat 330 Excavator	1	90	$128.26	$11,543
Cat 966F Loader	1	90	$123.66	$11,129
Cat 740 Haul Truck	2	90	$103.62	$9,326
Excavator Operator	1	90	$59.61	$5,365
Loader Operator	1	90	$59.61	$5,365
Truck Driver	2	90	$49.25	$4,433
Total Cost for Creek Channel Restoration Grading				**$47,161**

2.2.6 Scarification of Roads

It is assumed that a CAT D8R Bulldozer, configured with multi-shank ripper, will be used to scarify the roads. Moving at an assumed average rate of 2.2 m.p.h. (1st gear) it would take approximately four (4) hours to rip an estimated 18,000 feet of roadway, making four overlapping passes.

Equipment costs were derived from the Caltrans Labor Surcharge and Equipment Rental Rates manual (4/1/11-3/31/12). Labor rates are provided by the Department of Industrial Relations Prevailing Wage Determinations for Operating Engineers and Teamsters.

Task	Hours	Rate	Total
D8R Dozer	7	$169.58	$1,187
Operator Cost	7	$59.61	$417
Total Cost for Road Scarifying			**$1,604**

2.2.7 Finish Reclamation

Finished grading will include dressing out material storage areas, the Rock Plant site and other previously disturbed areas in preparation for revegetation.

Approximately 600 acres are currently disturbed, of this area approximately 542 acres of this total will require finish grading prior to revegetation. This total assumes that 30 acres of roadway will remain following reclamation and another 26acres within the Permanente Creek Restoration Area (PCRA)will not be graded. The table below assumes the use of a dozer with an average finish grading rate of one acre per hour. A dozer is preferred over a wheel type tractor because its track impressions will imprint final slopes to retain seeds and increase water retention and infiltration, thereby increasing the potential for revegetative success.

Task	Hours	Hourly Rate	Total Cost
Grading with a D8N	542	$153.43	$83,159
Operator Cost	542	$59.61	$32,309
Total Cost for Finish Reclamation Grading			**$115,468**

2.2.8 Installation of BMP's

After grading work has been completed and prior to revegetating the site temporary and permanent BMP's will be installed to stabilize slopes while vegetation is established and manage stormwater runoff. Temporary BMP's will include Straw Waddles and Silt Fencing to be installed in the PCRA. A total of four permanent desiltation basins will be constructed to manage runoff at the WMSA, North Quarry and EMSA; a total of four desiltation basins will be constructed. All BMP's recommended in the Reclamation Plan will be incorporated into the existing SWPPP once the RPA is approved. No additional SWPPP will be required to complete reclamation. Costs in the table below include all equipment and labor required to install BMP's.

Type	Cost Each	Quantity	Total Cost
Straw Waddles	$4.50	55,000	$247,500
Silt Fencing	$4.00	5,000	$20,000
Desiltation Basins	$20,000	4	$80,000
Total Cost for BMP Installation			**$347,500**

2.2.9 Boulder Removal

A number of limestone boulders have found their way into Permanente Creek as a consequence of mining operations. These boulders range in size from approximately

10" to 3' in diameter. The majority of these boulders falls within a size class of between 12" and 24" in size. This estimate assumes that 200 boulders are located within the inundation limits of Permanente Creek.

It is estimated that 25% of the boulders fall into the smaller sized fraction. These boulders will be removed using hand labor. Boulders ranging in size from 12" to 24" represent 60% of the total, while 15% fall in the upper size range. These boulders must be removed using a combination of hand labor and mechanized equipment.

The smaller of these boulders will be removed using hand labor, while the larger boulder will require mechanized removal. All of the boulders will be removed and deposited on the north side of Permanente Creek where they can be removed using a front end loader and dump truck.

Boulders in the 12" to 24" size fraction represent the majority of the boulders and will be removed using a variety of mechanized methods. Where the boulders can be removed by an excavator, these boulders will be placed within the bucket of the excavator using mechanized power assisted by hand labor. This estimate assumes that approximately 25% fall within this capability. Where boulders cannot be manipulated and removed directly using an excavator, large (1 cy) nylon bags will be used extract the boulders. The boulders will be placed into the bags using hand labor to roll the boulders into the bags. The bags will be connected to a choker that is connected to an excavator and pulled onto an area where they can be removed from the influence of Permanente Creek. Larger sized boulders would either be broken up into smaller pieces and removed using hand labor or anchor bolts will be inserted into the boulders. The anchor (eye bolts) will then be attached to a choker using a clevis and choker and pulled from the influence of Permanente Creek. Once removed from the creek, boulders will be loaded onto off-road haul trucks and hauled to the North Quarry for final placement. Costs in the table below include all labor and equipment necessary to complete the task of removing limestone boulders from Permanente Creek.

Task	Each	Hours	Rate	Total
Cat 330 Excavator	1	64	$128.26	$8,209
Cat 966F Loader	1	48	$123.66	$5,936
Cat 740 Articulated Haul Truck	1	64	$103.62	$6,632
Excavator Operator	1	64	$59.61	$3,815
Loader Operator	1	48	$59.61	$2,861
Truck Driver	1	64	$49.25	$3,152
Laborer	4	256	$43.93	$11,246
Total Cost for Boulder Removal				**$41,850**

2.2.10 Geotechnical Oversight

Backfilling operations as well as distribution of non-limestone capping material and Permanente creek restoration will require the oversight of a geological technician in the field during operations. Once all backfilling is completed a final report will be prepared by a Registered Geologist. Costs in the table below account for a field geologist to spend 20 hours per week for observing backfilling operations for approximately five years. Additional field time is also included in the table to account for time to geotechnical supervision of distribution of capping material and creek restoration grading.

Task	Hours	Hourly Rate	Total Cost
Geotechnical Monitoring	5,500	$100.00	$550,000
Final Geotechnical Report	80	$120.00	$9,600
Total Costs for Geotechnical Oversight			**$559,600**

Total Cost for Site Grading and Backfilling $37,449,631

2.3 Revegetation

The revegetation of disturbed lands at the Quarry is designed to establish a self-sustaining community of native species, in compliance with the Reclamation Plan and consistent with the Reclamation Standards identified in SMARA (California Public Resources Code, Article 9, Section 3705).

Previous restoration planting at the Quarry has been used as a guide for revegetation planning. Revegetated areas now dominated by native species serve as a basis for anticipated revegetation success. Native species common in revegetated areas include California buckwheat, coyote brush, buckbrush and sagebrush.

The goal for revegetation efforts is native community restoration. This refers to the reclamation of disturbed lands to a self-sustaining community of native species which will visually integrate with surrounding lands. Revegetation is designed to control erosion and stabilize slopes against long-term erosion using plant materials capable of self-regeneration without continued dependence on irrigation, soil amendments or fertilizer.

Revegetation relies on an adaptive management approach. Plant species selected for revegetation consist of native species known to occur on the quarry property. Preliminary species selection is shown in the tables below and includes species common in the area that have proven to be successful in past revegetation efforts. Depending on revegetative success, final species selection may include native plants observed within the greater quarry property.

<u>Growth Medium Distribution:</u>

Prior to revegetation, growth medium will be applied to approximately 542 acres of the site. Where container stock is installed on fill slopes, the target depth of growth medium is 12 inches, which is comprised of six inches of topsoil. Hydroseeded areas require six inches of growth medium comprised of three inches of topsoil. Of the 542 acres that will receive growth medium, a thickness of six inches of topsoil will be distributed over 28 acres of the site and a thickness of three inches of topsoil will be distributed over 514 acres for a total volume of 206,475 CY. All topsoil will come from within the RPA boundary; however it must be transported from locations around the site to areas of final placement. To transport the material around the site a team of off-road haul trucks will be utilized and D8 dozer will be used to spread the material out. A dozer is preferred to distribute the topsoil over a wheel type tractor because its track impressions will imprint final slopes to retain seeds and increase water retention and infiltration, thereby increasing the potential for revegetative success.

Fixed Time	
Load Time	2 min
Dump Time	.5 min
Total	2.5 min

Cat 740 Production Rates	Avg (ft) Distance	Avg Grade (%)	Avg Time (min)	Round Trip Time (min)	Total Trip Time (min)	Trips per Hour
Site Average Loaded	3,500	4	2.1	3.4	5.9	10.1
Site Average Empty	3,500	4	1.3			

Cat 740 Operational Logistics	Trips/Hour	740 Capacity (heaped)	CY/Hr	CY Total	Truck Hours Required
Logistics	10.1	30 CY	303	206,475	**682**

All costs to relocate and spread 206,475 CY of growth medium over areas of the site to be revegetated are included in the table below.

Equipment	Each	Rate	Hours	Total
Cat 988 Loader	1	$172.64	341	$58,870
Cat 740 Haul Truck	2	$234.11	682	$159,663
Water Truck	1	$36.77	341	$12,539
D8R Dozer	1	$169.58	341	$57,827
Loader Operator	1	$59.61	341	$20,327
Off-Road Haul Truck Driver	2	$49.25	682	$33,589
Water Truck Driver	1	$48.60	341	$16,573
Total Cost for Topsoil Distribution				**$359,387**

Soil Treatment

Slopes located in Subareas 2 and 3 of the PCRA are comprised of loose unconsolidated fill material. In an effort to reduce erosion from these slopes and provide more favorable surfaces for seed propagation the slopes will be compacted with a sheep's foot that is moved up and down the slopes by a winch.

Task	Each	Hours	Rate	Total
D8R Dozer W/Winch	1	16	$176.16	$2,819
Sheep's Foot Attachment	1	16	$11.93	$191
Operator Cost	1	16	$59.61	$954
Total Cost for Sheep's Foot Operation				**$3,964**

Hydroseeding:

The tables below summarize the hydroseeding components and associated costs that will be incurred for revegetation of 565 acres. See Attachment 3 for a seed quote from S and S Seeds and Pacific Coast Seed.

General Hydroseeding Seed Mix

Scientific Name	Common Name	Lb/Acre	Price/Lb	Total Cost For 542 Acres
SHRUBS				
Artemisia californica	California sagebrush	16	$45.00	$390,240
Baccharis pilularis	coyote brush	20	$36.00	$390,240
Eriogonum fasciculatum	California buckwheat	20	$7.50	$81,300
Salvia leucophylla	purple sage	2	$105.00	$113,820
Salvia mellifera	black sage	3	$54.00	$87,804
GRASSES AND HERBS				
Achillea millefolium	yarrow	2	$34.00	$36,856
Artemisia douglasiana	mugwort	1	$57.00	$30,894
Bromus carinatus	California brome	6	$9.00	$29,268
Elymus glaucus	blue wildrye	6	$15.00	$48,780
Eschscholzia californica	California poppy	2	$22.50	$24,390
Heterotheca grandiflora	telegraph weed	1	$90.00	$48,780
Lotus purshianus	Spanish clover	1	$97.50	$52,845
Lotus scoparius	deerweed	2	$36.00	$39,024
Lupinus nanus	sky lupine	1	$48.00	$26,016
Melica californica	California melic	2	$36.00	$39,024
Nassella pulchra	purple needlegrass	4	$45.00	$97,560
Poa secunda	one-sided bluegrass	2	$18.00	$19,512
Trifolium willdenovii	tomcat clover	2	$45.00	$48,780
Total		**93**		**$1,605,133**

PCRA Hydroseeding Mix

Scientific Name	Common Name	Lb/Acre	Price/Lb	Total Cost for 22 Acres
SHRUBS				
Artemisia californica	coastal sagebrush	10	$36.00	$7,920
Baccharis pilularis	coyotebrush	6	$24.00	$3,168
Eriogonum fasciculatum	Eastern Mojave buckwheat	16	$8.00	$2,816
Lotus scoparius	deer weed	2	$36.00	$1,584
Salvia mellifera	black sage	4.3	$48.00	$4,541
GRASSES AND HERBS				
Achillea millefolium	common yarrow	2	$20.00	$880
Artemisia douglasiana	Douglas' sagewort	1.9	$48.00	$2,006
Bromus carinatus	California brome	10	$7.00	$1,540
Clarkia purpurea ssp. quadrivulnera	winecup clarkia	1	$60.00	$1,320
Elymus glaucus	blue wildrye	6	$12.00	$1,584
Heterotheca grandiflora	telegraph weed	1	$60.00	$1,320
Lotus purshianus	bird's foot trefoil	3.6	$60.00	$4,752
Plantago erecta	dotseed plantain	3	$40.00	$2,640
Sisyrinchium bellum	western blue-eyed grass	1.4	$70.00	$2,156
Vulpia microstachys	small fescue	10	$16.00	$3,520
Total		**62.2**		**$41,747**

Riparian Hydroseeding Mix

Scientific Name	Common Name	Lb/Acre	Price/Lb	Total Cost for 1 Acres
Artemisia douglasiana	mugwort	2	$48	$96
Carex barbarae	valley sedge	3	$95	$285
Carex praegracilis	field sedge	3	$95	$285
Cyperus eragrostis	tall flatsedge	6	$85	$510
Hordeum brachyantherum	meadow barley	18	$16	$288
Juncus effusus	bog rush	1	$95	$95
Juncus patens	common rush	1	$90	$90
Leymus triticoides	creeping wildrye	6	$64	$384
Total		**40**		**$2,033**

Using mechanical hydroseeding equipment, finished slopes will be seeded, mulched, and composted in a single application. The hydromulch mix will contain compost, organic mulch, fertilizer and the seed mix. The compost provides an infusion of soil organic matter to the graded material that is richer in nutrients than the mulch. Organic matter provides a long-term source of nutrients, increases water holding capacity, and improves the texture of the soil.

Commercial fertilizers, intended for agricultural or ornamental applications, are inappropriate for restoration because they provide a strong flush of nutrients at concentrations rarely present in nature. The typical result is rapid growth of weedy grasses and herbs, which then may out-compete slower-growing chaparral species for sunlight and soil water. Biosol fertilizer is a slow-release fertilizer designed for restoration objectives, and provides a steady supply of major nutrients at relatively low concentrations.

Freedlun Hydroseeding provided a conservative cost quote for two separate hydroseed applications. The following cost includes all materials and labor required:

Area	Total Acres to Hydroseed	Hydroseed Slurry Application $/acre	Total Cost
Areas Disturbed from Mining	542	$1,350	$731,700
PCRA	23	$4,390	$100,970
Total			**$832,670**

<u>Bench Planting</u>

In addition to hydroseeding trees and shrubs container plantings will occur on the benches . Approximately 50 acres of the total revegetation area in the EMSA and Rock Plant areas will be planted as tree and/or shrub container planting areas. Shrubs will be planted at approximately 4.5-foot spacing and trees at 9-foot spacing in the designated planting areas.

North-facing benches will be revegetated with approximately 6.5 acres of oak-dominated plantings along with hydroseed. A target quantity of approximately 1,745 oak trees is scheduled to be planted in these areas, in addition to other native tree species. The oaks will be a mixture of acorn and container plantings.

Trees and Shrubs for Oak Woodland-North facing Benches				
Common name	**Scientific name**	**Unit Cost**	**Quantity per acre**	**Total Cost for 6.5 Acres**
Pacific madrone	Arbutus menziesii	$1.92	50	$623
Grey pine	Pinus sabiniana	$2.25	50	$731
Coast live oak	Quercus agrifolia	$2.25	54	$789
Canyon live oak	Quercus chrysolepis	$2.25	54	$789
Blue oak	Quercus douglasii	$2.25	54	$789
Valley oak	Quercus lobata	$2.25	54	$789
Interior live oak	Quercus wislizenii	$2.25	54	$789
Mountain mahogany	Cercocarpus betuloides	$2.76	142	$2,544
Toyon	Heteromeles arbutifolia	$1.16	142	$1,068
Scrub oak	Quercus berberidifolia	$1.92	142	$1,771
California coffeeberry	Rhamnus californica	$1.52	142	$1,404
Redberry	Rhamnus californica	$1.52	142	$1,404
Hillside gooseberry	Ribes californicum	$1.52	142	$1,404
Chaparral currant	Ribes malvaceum	$1.52	142	$1,404
Total			**1264**	**$16,298**

East-facing benches comprise of approximately 21.5 acres will be planted with 75 percent (approximately 8,660) grey pine (*Pinus sabiniana*), along with 25 percent other native tree and shrub plantings common to oak woodland habitats.

Trees and Shrubs for Pine Woodland- East facing Benches				
Common name	Scientific name	Unit Cost	Quantity per acre	Total Cost for 21.5 Acres
Pacific madrone	Arbutus menziesii	$1.92	22	$907
Grey pine	Pinus sabiniana	$2.25	403	$19,487
Coast live oak	Quercus agrifolia	$2.25	22	$1,064
Canyon live oak	Quercus chrysolepis	$2.25	22	$1,064
Blue oak	Quercus douglasii	$2.25	22	$1,064
Valley oak	Quercus lobata	$2.25	22	$1,064
Interior live oak	Quercus wislizenii	$2.25	22	$1,064
Mountain mahogany	Cercocarpus betuloides	$2.76	142	$8,415
Toyon	Heteromeles arbutifolia	$1.16	142	$3,534
Scrub oak	Quercus berberidifolia	$1.92	142	$5,857
California coffeeberry	Rhamnus californica	$1.52	142	$4,645
Redberry	Rhamnus californica	$1.52	142	$4,645
Hillside gooseberry	Ribes californicum	$1.52	142	$4,645
Chaparral currant	Ribes malvaceum	$1.52	142	$4,645
Total			**1529**	**$62,100**

Planting shrubs and trees will require the efforts of four common laborers and two pickup trucks along with the oversight of a revegetation specialist. Labor and equipment included in the table below accounts for plantings on 28 acres of the site.

Item	Each	Rate/Hr	Hours	Total
Pickup Truck	2	$17.10	120	$4,104
Laborers	4	$43.93	120	$21,086
Revegetation Specialist	1	$60.00	120	$7,200
Total Costs for Planting				**$32,390**

Permanente Creek Riparian Planting

In areas of Permanente Creek where the channel has been reclaimed, the 3:1 floodplain banks will be hand planted with container stock. Approximately 1.5 acres will require hand planting. This estimate assumes a mix of one gallon and smaller container stock planted at a spacing of about 5'. Costs for plant materials and labor were provided by WRA Inc. Costs in the table below include all labor and materials to install plantings along approximately 2,500 feet of the reclaimed Permanente Creek channel.

Total Number of Plants	Cost Per Plant	Total Cost
2,500	$12.14	**$30,350**

Permitting for Permanente Creek Restoration:

Prior to completing Permanente Creek restoration activities the proper permits must be obtained. These may include CDFG permits, ACOE permits or RWQCB permits. Costs for obtaining permits and completing a wetland delineation of Permanente Creek are included in the table below. Revegetation is considered successful when total tree, shrub and herbaceous cover meets 50 percent of the total treated surface. For the purpose of monitoring, slope units will be defined as contiguous expanses of slope treated during a single year or application event.

Permitting Costs	$40,000.00
Wetland Delineation	$5,000.00
Total	**$45,000.00**

Total Cost for Site Revegetation $3,031,072

2.4 Monitoring and Maintenance

A large number of trees and shrubs are proposed for planting within groupings of tree and shrub "islands" in areas of the EMSA and the Rock Plant. By planting a large number of trees and shrubs without irrigation, hearty trees and shrubs will be selected for increasing the chances of their survival. Approximately twice as many trees and shrubs will be planted than the total required to meet performance standards for this area of the site. Based on the preliminary results of test plots at the site and the strategy of planting "extra" trees and shrubs, the amount of replacement plantings required to meet performance standards are expected to be minimized. The costs for replacement plantings were estimated by the biological consultant and are incorporated into the total amount for annual weed control and general maintenance.

A restoration biologist will monitor the revegetated areas three times each year (spring, summer, and fall), and provide an annual report to Lehigh and Santa Clara County. The annual report will specifically assess the following:

- Numbers of trees surviving on each planted bench and slope unit
- General size and condition of trees
- General condition and extent of brush and herbaceous cover
- Overall progress toward a stable, natural plant community and towards meeting performance standards
- Noxious weed growth

The annual report should describe all actions taken during the preceding year and include recommendations for the upcoming planting season.

After planting, the area will be monitored and controlled to ensure unwanted plants do not threaten the success of revegetation efforts. The plants that are considered problematic can be found on the California Invasive Plant Council's weed inventory (Cal-IPC 2006). Noxious weeds present at the quarry include, but are not limited to: yellow star thistle (*Centaurea solstitialis*, annual); black mustard (*Brassica nigra*, annual); pampas grass (*Cortaderia sp.*, annual); and fennel (*Foeniculum vulgare*, perennial).

The site will be managed to prevent the spread of noxious weeds. At a minimum, monitoring will occur annually until performance standards have been met for two consecutive years (estimated at 5 years total) by means of visual observation to identify the potential for uncontrolled weed propagation. Should weed control be necessary, cultural methods will be implemented to eliminate the spread of noxious species.

In addition to biological monitoring and maintenance, costs for geologic and water quality monitoring are also included in the table below. Geotechnical monitoring will encompass inspection of all final slopes within the RPA boundary. These areas include the North Quarry high wall, scenic easement landslide, as well as other areas of the site. The costs below are based on personal communication with the biological and geological consultants who are familiar with the site.

Cost Item	Hours	Rate	Total
Annual Monitoring (Scientist/Tech)	130	$105	$13,650
Annual Monitoring (Project Manager)	12	$125	$1,500
Creek Restoration Monitoring (Biologist)	100	$105	$10,500
Geologic Monitoring (Geologist)	60	$125	$7,500
Water Quality Monitoring (QSP)	120	$105	$12,600
Water Quality Monitoring (QSD)	40	$125	$5,000
Report Preparation (Scientist/Tech)	50	$105	$5,250
Report Preparation (Project Manager)	10	$125	$1,250
Annual Weed Control and General Maintenance			$120,000
Total Annual Monitoring and Maintenance Costs			$177,250
Total 5-Year Monitoring and Maintenance Costs			**$886,250**

In addition to revegetation monitoring and maintenance, earthwork maintenance will be required for the five (5) year period following completion of reclamation activities. Earthwork maintenance will consist of maintaining and repairing slopes that are affected by uneven settling or erosion; specifically, areas of the North Quarry where backfilling has occurred, settling of fill material may occur. To maintain drainage and reclamation contours minor grading work is expected. Earthwork maintenance is expected to reduce as time passes with the greatest level of effort coming the first year after reclamation work is complete. No reclamation work is expected the in year six (6) following reclamation grading completion. A dozer will be utilized to recontour slopes and provide compaction of material as it operates. The dozer will also create a rough surface from the track impressions that will be beneficial for revegetation success. Revegetation maintenance costs for areas disturbed during earthwork maintenance are addressed in this section in the previous table. Costs in the table below only account for earthwork maintenance.

Monitoring Year	Hours of Grading Required
1	80
2	60
3	40
4	20
5	10
6	0
Total	210

Task	Hours	Rate	Total Cost
Grading with a D8N	210	$153.43	$32,220
Operator Cost	210	$59.61	$12,518
Total Cost for Finish Grading			**$44,738**

Total Cost for Monitoring and Maintenance **$930,988**

3.0 DIRECT COST OF RECLAMATION SUMMARY

Task	Cost
Removal of Equipment, Structures, & Rubbish	$292,362
Site Grading	$37,449,631
Revegetation	$3,031,072
Revegetation Monitoring and Maintenance	$930,988
Total Direct Reclamation Costs	**$41,704,053**

4.0 INDIRECT COST OF RECLAMATION

Item	Cost
Supervision Expense @ 2.4%	$1,000,897
Profit & Overhead Expense @ 4.0%	$1,668,162
Contingencies @ 4%	$1,668,162
Mobilization Expense @ 1.8%	$750,673
Total Indirect Cost	**$5,087,894**

5.0 SUBTOTALS

Total Direct Reclamation Costs	$41,704,053
Total Indirect Costs	$5,087,894
Total Direct and Indirect Cost of Reclamation	$46,791,947
Lead Agency Administrative Costs @ 2%	$935,839
Total Reclamation Costs	**$47,727,786**

TOTAL COST OF RECLAMATION $47,727,786

Attachment 1

Matt,

Per our conversation this morning the following are your costs:
CAT 330 wit Thumb: $1,350 day/$4,100 week/$12,500 month
CAT 330 with Breaker: $2,350 day/$6,850 week/$20,500 month
CAT 325/326 with Shear: $2,100 day/$6,200 week/$18,500 month

Delivery will not exceed $300 per excavator
Pickup will not exceed $300 per excavator

Regards,

Patrick Watson
Cresco Equipment
408-687-1696/Cell

Attachment 2

October 26, 2011

Mr. Warren Coalson
ENVIROMINE
3511 Camino Del Rio South
Suite 403
San Diego, CA 92108

SUBJECT: Permanente Reclamation

Dear Mr. Coalson,

We apologize for the delay in getting this information to you. As you can see from the descriptions none of this equipment is a standard price book item.

Being familiar with the Permanente facility we are concerned with how the primary will be fed. Physical room and the ability to feed the single primary may require two primaries each at 1000 – 1200 Tph to best utilize the trucks and/or loaders feeding the plant.

We selected conveyor runs of 2,375 feet each. This was to design the drives using components that would be available in the after market. That also allowed us to use conventional conveyor belting. Runs over 2,375' would require steel cord to handle the tensions. Not only is this more costly, but not always available. Also, belt repair and splicing are more difficult.

We have included freight estimates. Note sales tax would be additional. Terms would need to be discussed prior to all orders being placed. The prices shown are current List prices and should be valid for orders placed prior to the 2nd quarter 2012.

Delivery would most likely be in these ranges:

Primary:	12 – 16 weeks
Conveyor:	14 – 20 weeks
Stacker:	12 – 13 weeks

We trust this meets your requirements and that you will not hesitate in contacting Ken Walker at (818) 519-2367 if you have any questions or need additional information.

Very truly yours,

AGGREGATE MACHINERY SPECIALIST

John F. Mulligan

Cc: K. Walker
J.C. Mulligan

924 Calle Negocio, Unit A. ♦San Clemente, CA 92673 ♦ Phone: (949) 366-3070 ♦ Fax: (949) 366-3069
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ENVIROMINE

Hanson Permanente Reclamation

October 26, 2011

A. PRIMARY STATION

LIPPMANN-Milwaukee, Inc. J3862-VGF6224 Portable Electric Primary Jaw Crushing Plant, with the following specifications:

One (1)*LIPPMANN-Milwaukee, Inc.* Heavy-Duty Jaw Crusher, Model 38 x 62 with the following specifications:

LIPPMANN-Milwaukee heavy-duty jaw crushers have

- ♦ An extra heavily ribbed steel frame - stress relieved after welding and before machining;
- ♦ One-piece steel pitman;
- ♦ Heat-treated forged alloy steel eccentric shaft;
- ♦ Oversized tapered roller bearings in both the pitman and frame. Tapered roller bearings exhibit a greater load-carrying capacity than equal size spherical roller bearings that are used in most competitor's machines.
- ♦ Reversible manganese steel jaw dies and extensions;
- ♦ Hardox steel cheek plates;
- ♦ Manual hydraulic toggle adjustment;
- ♦ Two heavy-duty flywheels, one grooved for v-belts.
- ♦ Includes a 300 hp NEMA C high starting and breakdown torque TEFC electric motor for the crusher (starter, wiring and controls not included in base price of portable plant.

The 38x62 crusher includes an Automatic Oil Lubrication System

- ♦ Delivers a metered flow of filtered oil to each bearing.
- ♦ Low oil pressure alarm system.
- ♦ 20 gallon reservoir.
- ♦ 1/2 gpm oil pump with a 1 hp, 230/460 volt electric motor (starter and wiring not included), flow regulating valve, pressure gauge, piping, flow sights for return lines, immersion heater, and controls.
- ♦ Slide on and slide off feeder hopper module is a flared-type hopper with 3/4" HARDOX steel plate sides.

LIPPMANN-Milwaukee, Inc. 62" x 24' Vibrating Grizzly Feeder (Rip Rap Style), with the following specifications:

One (1) LIPPMANN-Milwaukee Heavy-Duty Horizontal Vibrating Grizzly Feeder, 62" Wide and 24' long, with the following specifications:

- ♦ 1 1/4" thick steel feeder pan, 14' feet long, with 1/2" thick Hardox steel liners on pan and 3/8" thick Hardox liners on side plates of feeder.
- ♦ (2) 5' long step deck grizzly section with adjustable bars and 2-1/2" to 4-1/2" nominal openings. The second section will have grizzly bars with nominal openings 5"-7" on discharge end.

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- ♦ Vibrating mechanism is a model LLH-26 with two full-length, self-counterweighted solid steel shafts
- ♦ Helical gears
- ♦ Four (4) 130 mm spherical roller bearings
- ♦ Oil splash lubrication system.
- ♦ Mechanism is enclosed in a dust proof housing.
- ♦ Driven sheave is included, in base price of the feeder.

The base plant includes
- ♦ 60” x 34’ (approx.) front discharge conveyor with 3 ply belting and 5” CEMA C idlers.
- ♦ Includes a (1)25 hp 1800 rpm TEFC electric motor.
- ♦ The plant has a by-pass chute under the grizzly section of the feeder.

The steel truck frame with king-pin (without front dolly) includes:
- ♦ Quad axle Hutch suspension with sixteen (16) Hub Piloted Wheels.
- ♦ 11:00 x 22.5 radial tubeless tires, and air brakes.
- ♦ Also includes all necessary chutes and supports, support legs, guards for v-belt drives, operator’s platform with railing and ladder, tail lights, reflectors, directional signals, mud flaps.

BUDGET PRICE: fob Point of Manufacture **$770,000.00**

<u>OPTIONS / ACCESSORIES</u>

1. Hydraulic leveling jacks, six (6) 70,000 lb., 24” stroke with a 8 hp gas power unit.

ADD: **$ 35,300.00**

2. NEMA - 12 Motor Control Center with dust-tight enclosure and full voltage magnetic starters for 60 hp (feeder), (1) 25 hp (front discharge conveyor), and 3/4 hp (Autolube System) motors with:
    - ♦ Circuit protection.
    - ♦ Also included is as solid state starter and circuit breaker for the 300 hp (crusher) electric motor.
    - ♦ Start/stop push buttons and wiring from the control center to the electric motors (30/60/460 volts).

ADD: **$ 31,200.00**

3. One (1) 60 hp, *Altivar* (Square D) AC electric variable speed drive and controls.
    - ♦ AC variable speed drive controller
    - ♦ Remote control station with 50' pendant cable, and motor circuit breaker.
    - ♦ Please note that this drive option includes an electric motor as noted in Option B. above.

ADD: **$ 15,000.00**

4. Hydraulic Toggle Assembly

ADD: **$ 61,000.00**

Freight is estimated at 5 loads, **$39,000.00**, and will be invoiced at our actual cost.

B. CONVEYOR SYSTEM

Superior 42"x 2375' Ground Line Channel Conveyor (4)

Conveyor Frame	
Intermediate frame	8" Channel, Bolt in cross members
Drive specifications	
Drive	Class I tail end 300HP
Gear reducer	Falk Drive
Brake	Svendborge Brake
Motor	300 HP 1800 RPM TEFC
V-belt drive	with drive guard
Capacity	2000 STPH of 100 PCF material, 25 degree surcharge (90% fines, 10% spherical lumps 6" minus), @ 212' of decline
Belt speed	600 fpm
Superior pulleys, crown face unless stated otherwise	
Drive/Tail pulley	42" diameter, 3/8" herringbone lagged Eng. drum
Snub pulley	36" diameter, 1/4" smooth lagged Eng. drum
Head pulley	32" diameter, Engineered drum
Shafts	Turned and polished
Bearings	split house
Take ups	Gravity Tower at tail end
Bend pulleys	32" diameter, 1/4" smooth lagged Eng. drum
Take-up pulley	32" diameter, 1/4" smooth lagged Eng. drum
Weight	Provided by others
Stationary	
Conveyor splice	conveyor unassembled for shipment
Supports	Fabricated from structural steel, 2' tall on 20' spacing, 8' discharge height
Conveyor Components	
Belting	4-ply-3/8x1/4 1200PIW
Belt splice	Flexco mechanical steel fasteners
Primary cleaner	Superior Exterra® Primary Belt Cleaner
Secondary cleaner	Superior SFL Dual Scraper
V-plow	Superior V-plow on return side
Superior Idlers	CEMA D, 5" dia. rolls, sealed for life ball bearings
Load area	20° trough, 16" spacing
Trough	35° on 3' 4" spacing

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Returns	steel rolls, on 10' spacing
Self Aligning	50' from ends every 100' after
Receiving hopper	sloped, 5' long, bolt on design
Gathering trough	with adjustable rubber flashing
Discharge hood	1/4" AR liner
Covers	not included
Emergency Stop	not included

<u>Additional Specifications</u>

Guarding	for drive and tail pulleys, v-belt drive and return idlers. Guards may not meet all local codes; customer is responsible to have guarding inspected.
Electrical	Control panel and wiring not included
Paint	1 coat primer, 1 coat enamel
Cross members	powder coated Superior Orange
Idler Paint	powder coated Superior Orange
Owner's Manual	(1) copy included for operation and maintenance.

BUDGET PRICE: fob Point of Manufacture **$1,285,000.00 each**

LOT OF FOUR: **$5,140,000.00 each**

<u>OPTIONS / ACCESSORIES</u>

1. Emergency stop switch, cables, brackets for <u>one side.</u>

ADD: **$ 11,520.00 per conveyor**

LOT OF FOUR: **$ 46,080.00**

2. Emergency stop switch, cables, bracket, for <u>both sides</u>.

ADD: **$ 21,900.00 per conveyor**

LOT OF FOUR: **$ 87,600.00**

3. Head end discharge hood, with replaceable ¼" AR liners.

ADD: **$ 3,950.00 per conveyor**

LOT OF FOUR: **$ 15,800.00**

Freight based on eight loads, 300' per load, and three loads of terminals, supports, and gravity take-ups would be **$40,00.00 per conveyor**. Belt would ship direct from vendor to jobsite.

C. RADIAL STACKER

Superior 30” x 190' Pit Portable TeleStacker® Conveyor

Conveyor frame	
Truss design	Heavy-duty truss, designed for maximum strength / weight ratio
Main conveyor	100' long with 84" deep truss
Stinger	100' long with 66" deep truss
Extension	conveyor extends to 190' long with hydraulic cable winch
Safety stop	mechanically stops retraction in the event of cable failure
Drive specifications (Main / Stinger)	
Drive	Class I head end
Gear reducers	shaft mount
Backstops	installed in reducers
Motors	(2) 50 / (2) 40 HP 1800 RPM TEFC
V-belt drive	with drive guard
Capacity	1500 STPH of 100 PCF material, 25 degree surcharge (90% fines, 10% spherical lumps 8” minus)
Belt speed	450/600 fpm
Superior pulleys	
Drive pulleys	18” diameter, 3/8” herringbone lagged drum
Tail pulleys	16” diameter, CEMA Chevron® wing pulley
Auto greaser	not included
Shafts	Turned and polished
Bearings	Sealmaster - Browning
Take ups	Screw type
Portability	
Undercarriage	Patented FB® Undercarriage, with hydraulic raise cylinders, pumping unit, and covers
Axle type	Pit Portable Axle
Transport axle	(8) 385/65D-19.5 tires, walking beam
Tag axle	not included
Axle Jacks	not applicable
Radial axle	transport axle manually swings to stacking position
Radial travel	2 wheel drive with 2 Hp planetary on each wheel
Fifth wheel	not applicable
Anchor pivot	customer-supplied concrete base secures tail end during radial travel

Brakes	not applicable
Lights	not applicable
Mud flaps	not applicable
Landing gear	not applicable
Towing eye	not included

Conveyor Components

Belting	3-ply 3/16 x 1/16 330 PIW
Belt splice	Flexco mechanical steel fasteners
Primary scrapers	not included
Secondary scrapers	requires primary
Superior Idlers	CEMA C, 5” dia. Moxie® rolls (trough), sealed for life ball bearings
Load area (main)	Superior Seal System, with 10" cartridges and steel rollers
Trough	35° (3.5' main / 4' stinger spacing)
Returns	steel cans, on 8' spacing
Self-aligning	Steel can troughing aligner on main / Superior Navigator® on stinger
Radial hopper	Rock box style
Gathering trough	6’ long with adjustable rubber flashing

Controls

Control system	Manual - electric buttons control power travel, conveyor raise, and stinger extension
Cable carrier cover	protect carrier from fugitive material
Matl. flow switch	not included, requires PilePro automation
Wireless remote	not included
Zero Speed Sensor	on stinger conveyor only
Voltage	480 v / 3 ph / 60 hz
Electrical	enclosure with main disconnect, circuit breaker, and starters with on/off push buttons to control each electric motor

Additional Specifications

Startup	on-site training not included
Guarding	for drive and tail pulleys, v-belt drive and return idlers. Guards may not meet all local codes; customer is responsible to have guarding inspected.
Paint	1 coat primer, 1 coat finish enamel Beige
Idler Paint	powder coated Superior Orange
Owner’s Manual	(1) copy included for operation and maintenance

BUDGET PRICE: fob Point of Manufacture **$ 621,750.00 per conveyor**

OPTIONS / ACCESSORIES

1. Belt scrapers on main and stringer conveyors

ADD: $ 4,900.00

2. Urathon return idlers, self-cleaning

ADD: $ 4,430.00

3. Spray bar on head end of main frame, with flood nozzles, water supply line down to tail section, control valve

ADD: $ 5,005.00

4. PilePro Automation – hydraulic functions are controlled by PLC parameters inputted by the operator, or may be manually controlled by switches in the control panel.

ADD: $ 7,500.00

5. Sonic Scout ultrasonic sensor, stops power travel when belt is empty

ADD: $ 1,230.00

6. PilePro Wireless Remote operates hydraulic functions from up to 1000' feet away.

ADD: $ 2,800.00

7. Auto Grease System for head pulley only.

ADD: $ 1,595.00

8. On-board Counterweight, maintains tail end during radial travel

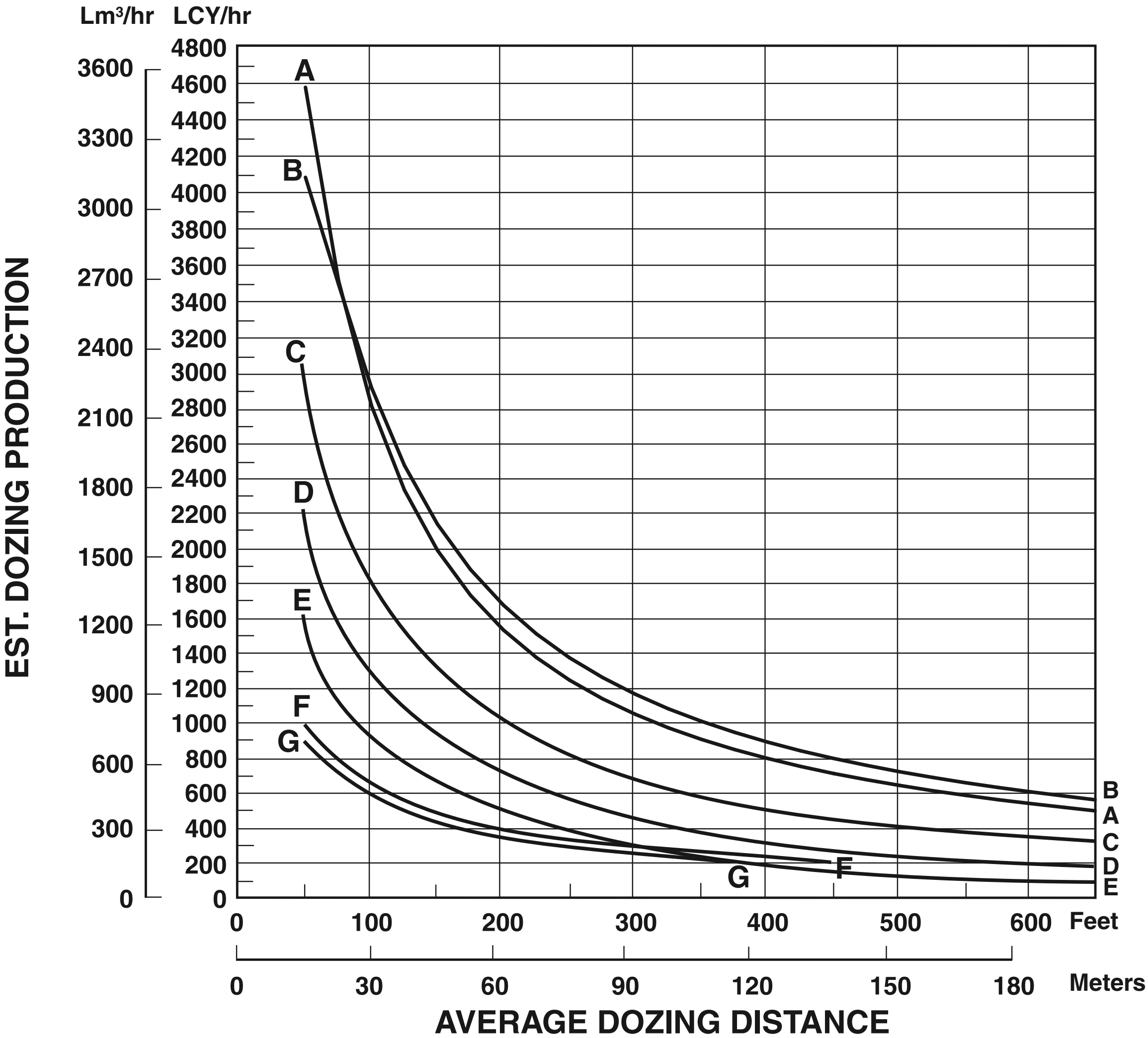
ADD: $ 5,950.00

Freight based on four loads is estimated at **$20,000.00**.

J.F. Mulligan
October 26, 2011

Attachment 3

ESTIMATED DOZING PRODUCTION ● Universal Blades ● D7G through D11T



KEY

A — D11T-11U
B — D11T CD
C — D10T-10U
D — D9R/D9T-9U
E — D8R/D8T-8U
F — D7R Series 2-7U
G — D7G-7U

NOTE: This chart is based on numerous field studies made under varying job conditions. Refer to correction factors following these charts.

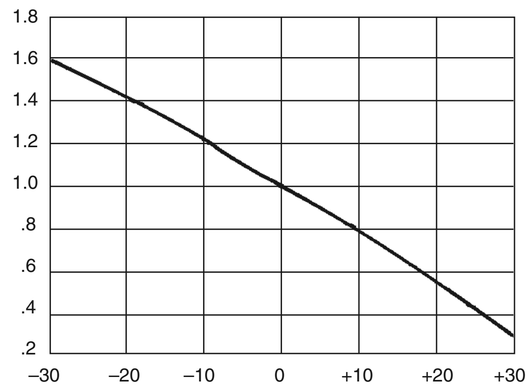
JOB CONDITION CORRECTION FACTORS

	TRACK-TYPE TRACTOR	WHEEL-TYPE TRACTOR
OPERATOR —		
Excellent	1.00	1.00
Average	0.75	0.60
Poor	0.60	0.50
MATERIAL —		
Loose stockpile	1.20	1.20
Hard to cut; frozen —		
with tilt cylinder	0.80	0.75
without tilt cylinder	0.70	—
Hard to drift; "dead" (dry, non-cohesive material) or very sticky material	0.80	0.80
Rock, ripped or blasted	0.60-0.80	—
SLOT DOZING	1.20	1.20
SIDE BY SIDE DOZING	1.15-1.25	1.15-1.25
VISIBILITY —		
Dust, rain, snow, fog or darkness	0.80	0.70
JOB EFFICIENCY —		
50 min/hr	0.83	0.83
40 min/hr	0.67	0.67
BULLDOZER*		
Adjust based on SAE capacity relative to the base blade used in the Estimated Dozing Production graphs.		
GRADES — See following graph.		

***NOTE:** Angling blades and cushion blades are not considered production dozing tools. Depending on job conditions, the A-blade and C-blade will average 50-75% of straight blade production.

% Grade vs. Dozing Factor

(–) Downhill
(+) Uphill



ESTIMATING DOZER PRODUCTION OFF-THE-JOB

Example problem:

Determine average hourly production of a D8T/8SU (with tilt cylinder) moving hard-packed clay an average distance of 45 m (150 feet) down a 15% grade, using a slot dozing technique.

Estimated material weight is 1600 kg/Lm^3 (2650 lb/LCY). Operator is average. Job efficiency is estimated at 50 min/hr.

Uncorrected Maximum Production — 458 Lm^3/h (600 LCY/hr) (example only)

Applicable Correction Factors:

Hard-packed clay is "hard to cut" material –0.80
Grade correction (from graph) . . . .–1.30
Slot dozing . . . .–1.20
Average operator . . . .–0.75
Job efficiency (50 min/hr) . . . .–0.83
Weight correction . . . .(2300/2650)–0.87

Production = Maximum Production × Correction Factors
= (600 LCY/hr) (0.80) (1.30) (1.20) (0.75) (0.83) (0.87)
= 405.5 LCY/hr

To obtain production in metric units, the same procedure is used substituting maximum uncorrected production in Lm^3.
= 458 Lm^3/h × Factors
= 309.6 Lm^3/h

APPENDIX F

Revisions to Draft EIR Section 4.10, Hydrology and Water Quality

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4.10 Hydrology and Water Quality

This section discusses the existing environmental and regulatory setting of the Project, identifies potential impacts related to implementation of the Project, and proposes mitigation measures for those impacts determined to be significant. Setting information in this section was compiled from the Reclamation Plan Amendment (RPA) (EnviroMINE, 2011), technical reports prepared in support of the RPA and peer reviews of those reports, resource agency websites and databases, and Geographic Information System (GIS) data.

4.10.1 Setting

4.10.1.1 Regional Climate and Precipitation

The Quarry is located in the southern San Francisco Bay (Bay) area, in the foothills of unincorporated western Santa Clara County, just west of the City of Cupertino. The climate of the southern Bay area is Mediterranean, characterized by mild, wet winters and warm, dry summers. Temperatures in the County tend to be fairly mild, and rarely drop far below freezing in the valley flat (SCBWMI, 2003). Mean annual precipitation at the Quarry is approximately 25 inches (County of Santa Clara, 2007). Rainfall distribution in the Project Area is strongly controlled by topography, as annual rainfall is greatest on high ridges to the west and decreases eastward toward the Santa Clara Valley. Almost all precipitation falls as rain between October and April.

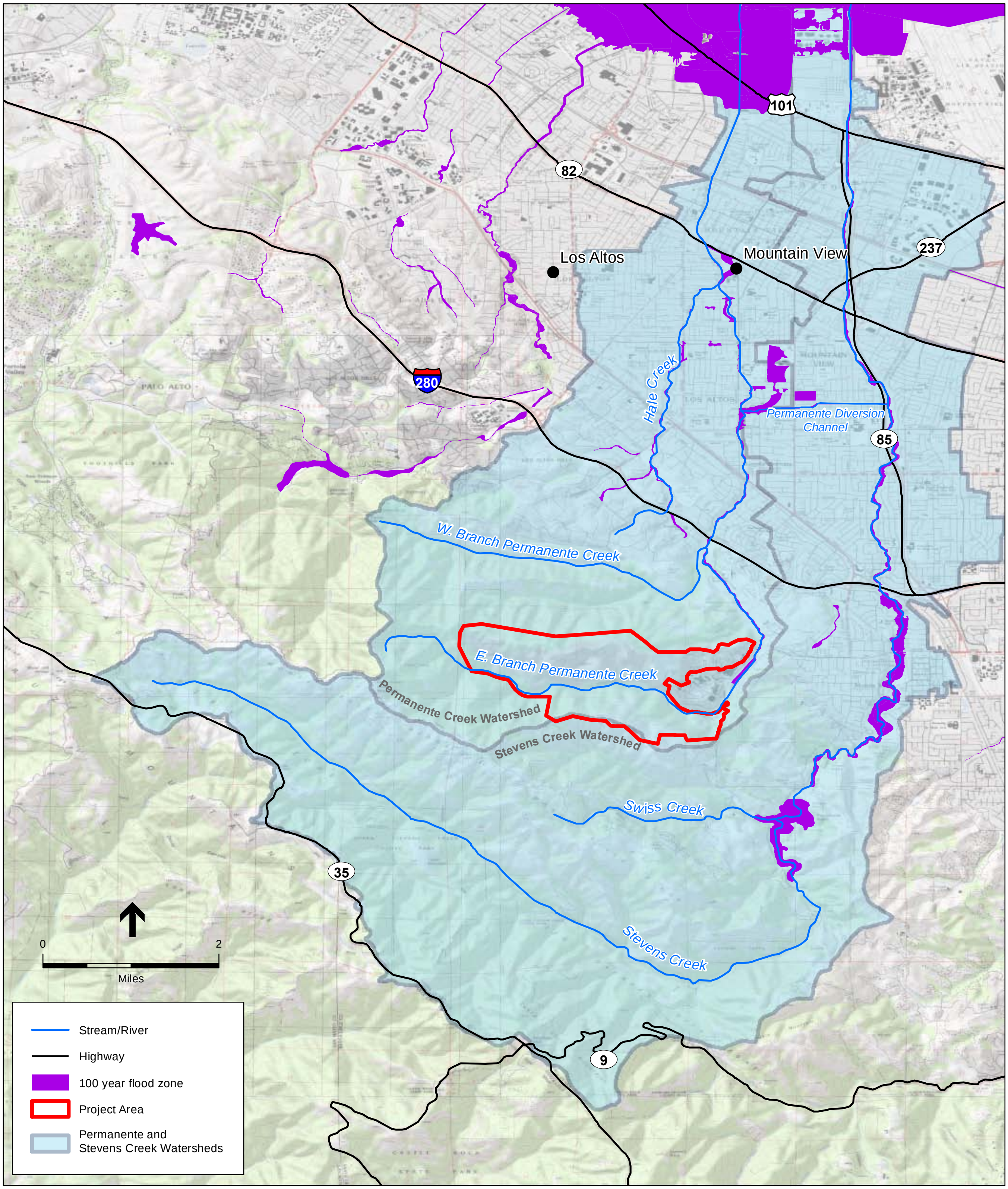
4.10.1.2 Surface Water Hydrology and Drainage

Permanente Creek Watershed

The Quarry lies within the Permanente Creek watershed (**Figure 4.10-1**). Permanente Creek discharges into southern San Francisco Bay (South Bay). The entire Permanente Creek watershed comprises approximately 17 square miles of land, and the main channel is about 13 miles in length, rising on the southeast side of Black Mountain (elevation 2,800 feet) and flowing east then north to the South Bay (SCBWMI, 2003; RWQCB, 2007a).[1] Other than the Quarry and some rural residential development, the upper watershed is relatively undeveloped.[2] In the lower watershed, Permanente Creek flows through the cities of Los Altos and Mountain View and discharges into the South Bay through the Mountain View Slough. Most of the lower watershed within the Santa Clara Valley is heavily urbanized and the channels have been extensively modified. In the lower watershed, peak flows of up to 1,500 cubic feet per second (cfs) are diverted to Stevens Creek (to the east) by way of the Permanente Creek Diversion, which was constructed in 1959 (SCBWMI, 2003). The diversion structure was designed to allow low flows to continue downstream in Permanente Creek while routing a substantial portion of the larger flood flows into Stevens Creek.

1 Unless otherwise noted, all reported elevations in this chapter refer to feet above mean sea level (amsl).

2 The *lower* watershed, or lower Permanente Creek, refers to the watershed area and stream reaches downstream of Interstate 280; the *upper* watershed, or upper Permanente Creek, refers to the watershed area and stream reaches upstream of Interstate 280.



SOURCE: FEMA, 2007;
Creek and Watershed Map of the Santa Clara basin, 2005

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Figure 4.10-1
Regional Hydrologic Setting

The Quarry is located in the upper watershed in the southern headwater area of the Permanente Creek watershed, which encompasses approximately 3.9 square miles of steep, upland terrain on the east side of the Santa Cruz Mountains.[3] Elevations in the southern headwater area range from 400 to 2,800 feet, and the average is 1,400 feet (Nolan and Hill, 1989). Most of the southern headwater area that is undisturbed by activities related to the Quarry is undeveloped and dominated by chaparral and upland broadleaved forest and, to a lesser extent, grassland areas.

Driven by the Mediterranean climate, flow in Permanente Creek generally rises in late fall or early winter and then recedes throughout a long base flow period during the spring and summer. In most years Permanente Creek remains perennial, but during particularly dry years (e.g., Water Year 1987)[4] the creek will cease to flow in the summer or early fall (Nolan and Hill, 1989). Like most small watersheds draining parts of the Coast Ranges, annual flow volumes and peak discharges are highly variable, both within a given year as well as from one year to the next. The steep topography of the upper watershed results in short duration, high intensity runoff during storm events.

Quarry Area

The land associated with the Quarry accounts for much of the watershed area composing the Permanente Creek southern headwater area, 6 percent of which is impervious surfaces (Nolan and Hill, 1989). While much of the site drains directly or indirectly to Permanente Creek, a portion of the Quarry area drains directly into the Quarry pit. Water that is pumped out of the pit is discharged into the creek. Although most of the runoff from the WMSA flows to the Quarry pit, some stormwater runs off the WMSA and is ultimately conveyed to the creek ~~further~~ farther downstream of the site where Wild Cat Canyon Creek approaches I-280.

Permanente Creek has been considerably modified along particular reaches on the site. The creek alignment has been altered and straightened in some areas, and portions of the creek bordering the Quarry are contained within a culvert or open concrete-lined channel. Additionally, there are at least two instream detention ponds within the reach of Permanente Creek adjacent to the Project Area.[5] At the upstream and downstream ends of the site, Permanente Creek is typically perennial, yet over the middle section of the site (e.g., directly south of the Quarry pit) Permanente Creek tends to flow only intermittently (Golder Associates, 2011). Downstream of the intermittent reach, dewatering of the Quarry pit provides or supplements the flow in Permanente Creek, which helps to keep the flow regime largely perennial downstream of the dewatering discharge point.

[3] The *southern headwater area* generally refers to the Permanente Creek watershed upstream of the confluence with West Fork (or Branch) Permanente Creek.

[4] A Water Year begins on October 1 of the previous year and ends on September 30 of the designated Water Year. For example, Water Year 1987 comprises October 1, 1986 through September 30, 1987.

[5] The term *instream*, in this case, is used to refer to ponds/structures that are built within the low-flow channel (i.e., not within the bank full channel margins, or within the broader floodplain area)

Surface Water Quality

In general, water quality within streams depends on the mineral composition of the soils and associated parent material (e.g., bedrock) in the watershed, the hydrologic and hydraulic characteristics of the streams, the types of contaminant sources present in the watershed, and the extent and nature of human development and disturbance.

The San Francisco Bay Regional Water Quality Control Board (RWQCB) is responsible for the protection of water quality and the development of water quality standards for the area of Santa Clara County that includes the Project Site. Through a process governed by the Federal Clean Water Act (CWA), the RWQCB (2007b) has formally identified water quality issues for water bodies within and near the Project area (e.g., Permanente Creek and Stevens Creek). Section 303(d) of the CWA requires that states develop a list of water bodies that do not meet water quality standards, establish priority rankings for waters on the list, and develop action plans, called Total Maximum Daily Loads (TMDL), to improve water quality.[6] In 2007, the RWQCB compiled the 303(d) list for the San Francisco Bay Area (RWQCB, 2007b) based on recommendations from staff and information solicited from the public and other interested parties. Further, on February 11, 2009, the RWQCB adopted a resolution (RWQCB, 2009) approving staff recommendations for proposed additions, deletions and changes to the 303(d) list of impaired water bodies for the Bay area; this included proposals for listing Permanente Creek as impaired for selenium and water toxicity. The list of existing and proposed impaired water bodies relevant to the Project area is presented in **Table 4.10-1** (further information regarding federal, state, and local water quality policies and regulations, including water quality objectives, beneficial uses, and water quality standards, is presented below in Section 4.10.1.4, *Regulatory Setting*).

Through regionally-based monitoring programs, both the RWQCB and the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) have, to varying degrees over the last 8 years, monitored and assessed water quality conditions within the Permanente Creek watershed. Existing water quality issues have been documented within the Permanente Creek watershed, particularly in the lower reaches of the creek that traverse the more heavily urbanized areas. For example, the RWQCB (2007a) has noted that temperature and dissolved oxygen conditions throughout the watershed would make it difficult for Permanente Creek to support salmonid populations without further improvements. Nutrient and contaminant data indicate considerable inputs of metals, pesticides, and PAHs in the lower watershed. Further, toxicity tests indicate the presence of constituents at toxic levels both at the upstream and downstream ends of the most urbanized areas of the Permanente Creek watershed. (RWQCB, 2007a). The monitoring data (RWQCB, 2007a; SCVURPPP, 2007) generally suggest that the urban areas are of most concern for stream degradation and for transport of metals, PAHs, and legacy pesticides to the Bay. However, in the vicinity of the Quarry, monitoring data and previous investigations suggest that the existing concentrations of total dissolved solids (TDS), sulfate, some metals, including selenium and mercury, and suspended sediments are relatively high.

6 A TMDL defines how much of a specific pollutant a given water body can tolerate without exceeding water quality standards, and serves as the means to attain and maintain water quality standards such that the water body could support designated and potential beneficial uses identified in the San Francisco Bay Basin Water Quality Control Plan (RWQCB, 2007b).

TABLE 4.10-1
EXISTING AND PROPOSED SECTION 303(D) LIST OF IMPAIRED WATER BODIES

Water Body	Pollutant	Proposed or Approved TMDL Completion Date[b]	Potential Sources
Permanente Creek	Diazinon	2006 (approved)[c]	Urban Runoff/Storm Sewers
	Toxicity[a]	2021	Unknown
	Selenium[a]	2021	Unknown
Stevens Creek	Diazinon	2006 (approved)[c]	Urban Runoff/Storm Sewers
	Toxicity	2019	Unknown
SF Bay, South	Chlordane, DDT, Dieldrin	2008	Nonpoint Source
	Dioxin Compounds, Furan Compounds	2019	Atmospheric Deposition
	Exotic Species	2019	Ballast Water
	Mercury	2006	Atmospheric Deposition, Industrial and Municipal Point Sources, Natural Sources, Nonpoint Sources, Resource Extraction
	Polychlorinated biphenyls (PCBs)	2006	Unknown Nonpoint Source
	PCBs (dioxin-like)	2019	Unknown Nonpoint Source
	Selenium	2019	Agriculture, Domestic Use of Groundwater

NOTES:

[a] The RWQCB has adopted a resolution (no. R2-2009-0008) (RWQCB, 2009) approving recommended changes to the existing 303(d) list, including the recommendation to list Permanente Creek as impaired by diazinon and toxicity. Staff will now transmit the changes to the 303(d) list to the State Water Resources Control Board, which will approve statewide revisions to the list. The 2008 303(d) list will take effect when the U.S. Environmental Protection Agency considers and approves a final list.

[b] The date of planned TMDL completion is provided in the 303(d) lists from the State Water Resources Control Board. Although the planned date of completion has been passed for many of the TMDL projects, approved TMDLs have not been completed as of September 2010.

[c] A Basin Plan amendment incorporating a TMDL and water quality attainment strategy for diazinon and pesticide-related toxicity in the Bay Area's urban creeks has been incorporated into the Basin Plan. The amendment was adopted by the RWQCB on November 16, 2005, and approved by the State Water Resources Control Board on November 15, 2006. It has been approved by the State Water Board, the Office of Administrative Law, and the U.S. Environmental Protection Agency. The final plan, incorporating all amendments, was published January 18, 2007. (RWQCB, 2007c)

SOURCE: RWQCB, 2007b; RWQCB, 2009

The effect of these conditions on aquatic life in Permanente Creek has been studied (WRA, 2011). The creek was found to support several amphibian, fish, and benthic invertebrate species in both upstream and downstream locations, including a resident population of rainbow trout in upstream areas where year-round flows exist. Waste screen bio-analyses were conducted on water collected from a location below the Quarry pit discharge point in February and April 2009 using fathead minnows (*Pimephales ~~P~~promelas*), with a 100 percent survival rate over a 96-hour period (WRA, 2011). As such, laboratory analysis shows that existing water quality in Permanente Creek is not acutely toxic to some fish species. However, studies have not been performed to determine whether selenium concentrations in fish located in portions of Permanente Creek downstream from the Quarry differ from than those in fish located upstream from the Quarry.

General Minerals and Metals

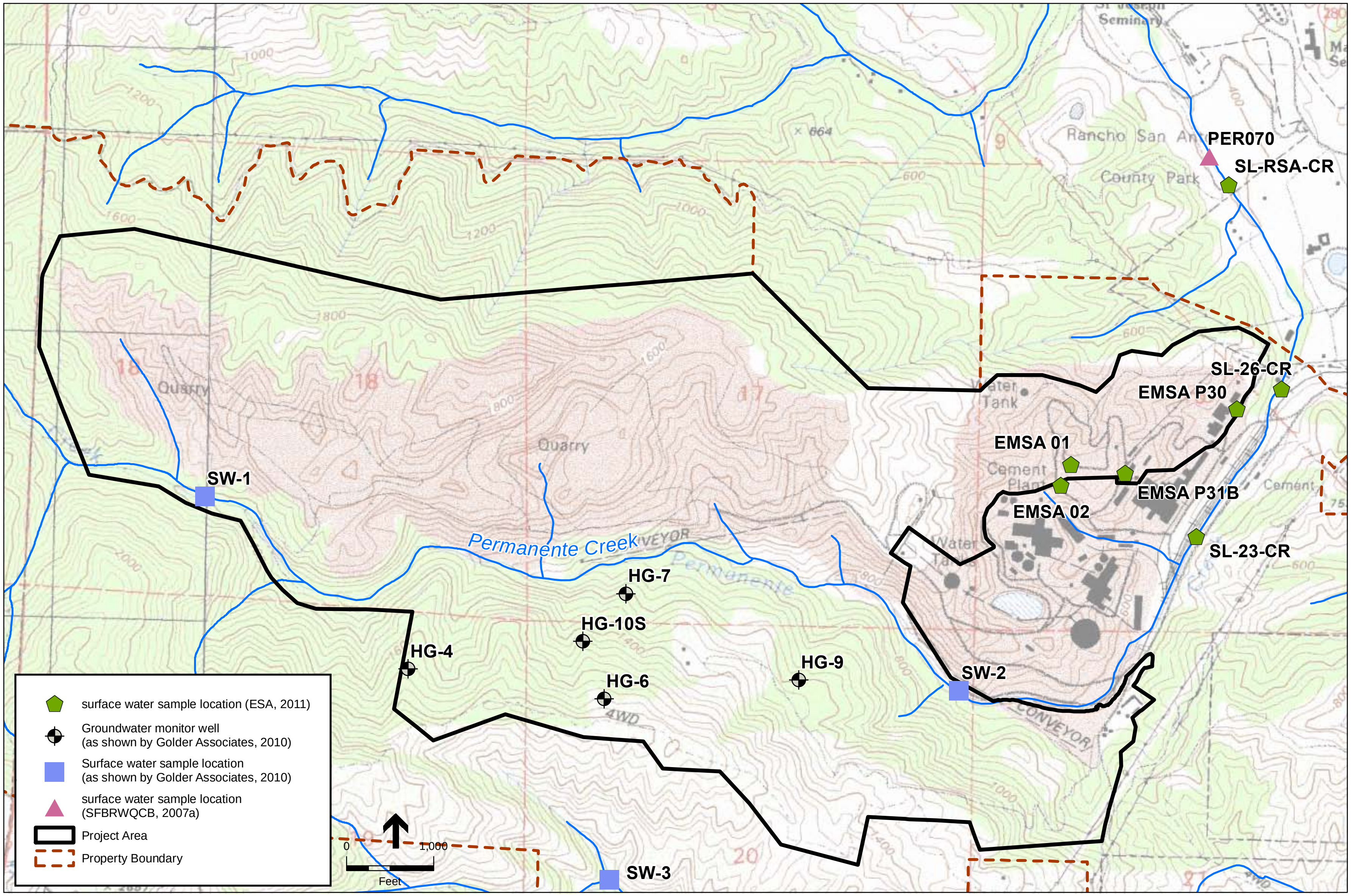
Compared to nearby areas, the Permanente Creek watershed likely has more naturally occurring mineralized rock outcrops and these could be contributing to the relatively high concentrations of some constituents in background water (SES, 2011). Based on surface water samples from locations on Permanente Creek adjacent to and just downstream of the Quarry site (see **Figure 4.10-2**), surface water quality parameters generally meet relevant objectives within the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan) (RWQCB, 2007c), with the exception of TDS, sulfate, nickel, mercury, and selenium (**Table 4.10-2**).[7] Further, water quality monitoring conducted by the RWQCB (2007a) and the SCVURPPP (2007) has also shown that selenium concentrations in Permanente Creek, in the reaches adjacent to and near the Quarry, are generally greater than the water quality objective presented in the Basin Plan. The RWQCB (2007a) reported that, at their upstream Permanente Creek monitoring site (PER070; see Figure 4.10-2), which is just downstream of the Quarry, the selenium concentration in water was greater than the Basin Plan water quality objective for aquatic life during all three seasons sampled (i.e., dry, wet, and spring). In general, measured dissolved selenium concentrations in Permanente Creek have ranged from 1.7 to 81 micrograms per liter (µg/l) in the vicinity of the Quarry (Table 4.10-2); the (4-day average) Basin Plan objective for selenium is 5 µg/l (RWQCB, 2007c).

Various water quality parameters have been measured within runoff from the EMSA, the Quarry pit, and the WMSA. The WMSA contains the same type of overburden and waste rock that is and would be placed within the EMSA as well as within wall-washing samples (Table 4.10-2).[8] Sampling of surface runoff from the EMSA area, which included flowing, concentrated runoff (e.g., within a ditch/gully and from detention pond inlet pipes) as well as still water from detention ponds, found levels of selenium and mercury that were almost always in excess of the Basin Plan objectives. The vast majority of the selenium detected in each sample was in the dissolved form, rather than being associated with suspended sediment and measured only as the total recoverable selenium. Similar to the general surface water characteristics, a sample of runoff from the WMSA met the relevant water quality objectives within the Basin Plan, with the exception of TDS, sulfate, molybdenum, and selenium. Also, wall-washing samples from the Quarry pit further indicate that selenium is likely readily dissolved and transported from the exposed limestone rock surfaces by surface runoff.

Waterborne selenium concentrations in the Project Area can be compared with background conditions (described above) and also with ~~standards~~ Water Quality Objectives for surface water as established by the RWQCB in the current Basin Plan (RWQCB, 2007c) or with other promulgated values such as Maximum Contaminant Levels (MCLs) from the U.S. Environmental Protection

7 The objective for nickel is based on hardness, and the objective value assumes a hardness of 100 mg/l calcium carbonate ($CaCO_3$) (RWQCB, 2007c). For example, higher hardness values would result in higher concentration values for the water quality objective according to the equations presented by the RWQCB (2007c). The referenced surface water samples (i.e., at SW-1 and SW-2) also reported relatively high hardness values (i.e., between 600 and 800 mg/l, on average). Therefore, the reported nickel concentrations, though high in some instances, would likely not exceed the Basin Plan water quality objectives.

8 Wall-washing refers to tests that were performed on exposed rock faces within the Main Pit. The tests involved washing an approximately one square meter area of rock face with a known volume of water. The resultant water was analyzed for dissolved and total metal concentrations and general minerals. The amount of wash water used in the tests was approximately equivalent to a 0.25-inch rain event (SES, 2011).



SOURCE: Golder Associates, 2010; SFBRWQCB, 2007a; Sowers et al., 2005; ESA, 2011

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Figure 4.10-2
Project Area Monitoring and Sampling Locations

Agency (USEPA) ~~(collectively, Benchmarks)~~ to characterize existing conditions. Selenium concentrations at SW-1 (7.18 µg/l; upstream Permanente Creek) were more than an order of magnitude higher than background as reflected by SW-3 (0.366 µg/l) in the adjacent Monte Bello Creek watershed. The effect of the ongoing Quarry pit dewatering discharges (which enter the creek between SW-1 and SW-2) on existing Permanente Creek water quality is indicated by the samples collected at SW-2 (the downstream location in Permanente Creek), where dissolved selenium concentrations ranged from 13 to 81 µg/l.[9] A Quarry pit water sample in January 2010 had a dissolved selenium concentration of 82 µg/l (Golder, 2011), indicating that dewatering is a significant factor with respect to selenium concentrations in the creek. Mercury, which occurs naturally in the various rock types and in groundwater, meets the Water Quality Objectives ~~Benchmarks~~ at both SW-1 and SW-2 apart from one isolated exception at 0.07 µg/l, which is not significantly above the 0.025 µg/l 4-day average ~~goal~~ objective and is below the 2.4 µg/l 1-hour ~~goal~~ objective (CH2M Hill, 2011). Elevated concentrations of mercury were found at several locations within the property (up to 8.9 µg/l in an atypical sample with a large amount of suspended sediment in it from a roadway).

Selenium is released from limestone materials through biogeochemical processes when the rock surface is exposed to water and oxygen. Selenium is chemically similar to sulfur; dissolved selenium typically occurs in an oxidized form (oxygen-rich forms of selenate or selenite, which are analogous to sulfate and sulfite). If the oxidized forms are transported into a chemically reducing (i.e., with little or no oxygen, referred to as anoxic or anaerobic) environment, they will be transformed to the reduced forms (selenide or elemental selenium). Elemental selenium is a solid, and selenide forms insoluble compounds with iron, calcium, and other common mineral cations (SES, 2011). Selenide can also form volatile compounds that de-gas to the atmosphere.

Leaching of Constituents from Quarry Rock

An important characteristic of the Project Area with respect to water quality is the leachability of various constituents, particularly selenium, from rocks at the site. Studies were conducted to characterize the principal rock types in the site vicinity, their chemical characteristics, and the leachability of constituents from them (SES, 2011). The predominant rock type that is extracted and processed onsite is limestone, which grades from a dark bituminous limestone to a gray to white, high-chert-content limestone. The Quarry primarily produces limestone for cement production and for construction aggregate uses. "Limestone" in this section refers to cement-grade limestone, and "aggregate" means other limestone grades and greenstone suitable for use in construction aggregate products. The term "overburden" refers to rock materials that are not suitable for use as limestone or aggregate. They include rocks such as greenstones, metabasalts, and greywacke in addition to minor amounts of low-grade limestone not suitable for use as aggregate.

To characterize rock materials present in the Quarry and overburden material such as that in the EMSA and WMSA, several different types of tests were conducted (SES, 2011). The tests included determining the total metals and selenium content of the rocks and the leachability of

[9] Permanente Creek is at least partially dewatered upstream of sample location SW-2. Water that is captured by the pit is pumped back into the creek via a pond adjacent to the creek.

TABLE 4.10-2
MONITORED POLLUTANT CONCENTRATIONS IN PROJECT AREA

	TDS (mg/l)		sulfate (SO_4) (mg/l)		Metals (dissolved fraction unless otherwise indicated)[o] iron (µg/l)		manganese (µg/l)		mercury (µg/l)		molybdenum (µg/l)		nickel (µg/l)		selenium (µg/l)	
	range/discrete[p]	average	range/discrete	average	range/discrete	average	range/discrete	average	range/discrete	average	range/discrete	average	range/discrete	average	range/discrete	average
Surface Water																
Permanente Creek																
SW-1[b]	350 - 1,800	1,110	450 - 1,110	578	**(<7.2) - 9.7	6.6	0.3 - 1.9	0.9	0.0008 – 0.055	0.015	1.8 - 5.7	3.8	2.2 - 4.7	3.1	1.7 - 11.0	7.2
SW-2[b]	1,000 - 1,100	1,067	550 - 600	570	(<9.3) - 18.0	8.0	2.1 - 3.9	2.8	0.0013 – 0.07	0.0187	83 - 750	440.8	27 - 110	62.8	13 - 81	62
SL-23-CR[i]	--	--	--	--	--	--	--	--	0.056[j]--	--0.056[j]	120[j]--	--120[j]	29[j]--	--29[j]	24--	--24
SL-26-CR[i]	--	--	--	--	--	--	--	--	0.052[j]--	--0.052[j]	110[j]--	--110[j]	27[j]--	--27[j]	22--	--22
SL-RSA-C[i]	--	--	--	--	--	--	--	--	(<0.025)[j]--	--(<0.025)[j]	120[j]--	--120[j]	24[j]--	--24[j]	23--	--23
PER070[a]	720 - 850	765	326 - 379	347	--	--	--	--	--	--	--	--	1.6 - 30.9	13.5	5.1 - 18.8	9.9
ZOMB-1[l]	310	--	--	--	--	--	--	--	0.00026	--	ND<5	--	ND<5	--	ND<10	--
SL-4A3-PD[m]	930	--	--	--	--	--	--	--	0.00678	--	340	--	110	--	48	--
PERMUS[n]	720	--	--	--	--	--	--	--	0.00731	--	140	--	33	--	19	--
Monte Bello Creek																
SW-3[b]	340 - 360	353	18 - 28	22.8	ND (<9.3 - <7.2)	ND(<7.2)	0.11 –1.4	0.6375	<0.0002—0.00089	0.0006	0.91 - 24	9.63	0.87 – 1.4	1.14	ND (<0.38) - 0.71	0.366
Upland Runoff																
EMSA 01 (road)[i,k]	--	--	--	--	--	--	--	--	--	8.9[j]	--	31[j]	--	3400[j]	--	33
EMSA 02 (ditch/gully)[i]	--	--	--	--	--	--	--	--	--	0.062[j]	--	96[j]	--	14[j]	--	38
EMSA P31B-IN (pond inlet)[i]	--	--	--	--	--	--	--	--	0.091 -- 0.11	0.105[j]	12 --160	86[j]	49 --180	115[j]	8.3 -- 36	22
EMSA P31B (pond)[i]	--	--	--	--	--	--	--	--	0.037 -- 0.099	0.068[j]	19 -- 74	47[j]	19 --110	65[j]	12 --18-	15
EMSA P30-IN (pond inlet)[i]	--	--	--	--	--	--	--	--	<0.025 -- 0.36	0.031[j]	6.3 -- 70	38.1[j]	18 -- 150	84[j]	7.1 -- 22	15
EMSA P30 (pond)[i]	--	--	--	--	--	--	--	--	-0.073 -- 0.039	0.056[j]	20 -- 47	34[j]	20 -- 49	35[j]	13 –19	16
WMSA[g]	900--	900	550--	550	(<9.3)--	(<9.3)	14--	14	--	--	120--	120	3.4--	3.4	29--	29
Groundwater																
HG-4[b]	880 - 1,500	1,220	380 - 770	605	(<7.2) – 33	16.4	19 – 120	85	0.011 – 0.023	0.015	31 – 45	38	1.3 – 24	9	0.27 – 3.9	1.4
HG-6[b]	460 – 490	470	8.6 – 16	13	(<7.2) – 46	26	33 – 58	45	0.001 – 0.006	0.002	1.3 – 3.6	2.5	0.47 – 2.1	1	(<0.4)	(<0.4)
HG-7[b]	530 - 580	547.5	29 - 31	30.3	290 - 330	310	320 - 330	325	0.014 – 0.068	0.032	0.54 – 0.81	0.68	1.7 – 3.1	2.28	--	(<0.38)
HG-9[b]	450 - 490	470	26 - 48	35.8	--	(<9.3)	0.19 - 17	6.6	0.001 – 0.024	0.008	0.93 – 3.7	2.5	1.6 – 2.9	2.33	(<0.38) – 0.9	0.5
HG-10S[b]	340 - 400	370	29 - 30	29.5	(<9.3)	(<9.3)	0.16 - 85	42.6	0.063	0.063	5 - 16	10.5	1.7 - 10	5.9	(<0.38) – 2.8	1.5
Wall Washing																
*Limestone (HG)[f,o]	110	--	100	--	130 [83,000[j]]	--	19 [2,000[j]]	--	[<0.016[j]]	--	98 [320[j]]	--	9.9 [1,300[j]]	--	49 [230[j]]	--
*Limestone (MHG)[f,o]	65--	--65	61--	--61	11 [69,000[j]]--	--11	2.6 [7,200[j]]--	--2.6	[<0.016[j]]--	--	6.7 [23[j]]--	--6.7	0.91 [1,100[j]]--	0.91	14 [60[j]]--	--14
*Limestone (MLHG)[f]	91--	--91	15--	--15	160 [2,400,000[j]]--	--160	1.2 [56,000[j]]--	--1.2	[0.032[j]]--	--	14 [<23[j]]--	--14	4.9 [150,000[j]]--	4.9	0.7 [160[j]]--	--0.7
Greywacke[f]	61--	--61	4.9--	--4.9	720 [100,000[j]]--	--720	8.6 [3,000[j]]--	--8.6	[0.032[j]]--	--	2.6 [16[j]]--	--2.6	1.7 [210[j]]--	1.7	(<0.38) [<11[j]]--	--(<0.38)
Chert[f]	67--	--67	2.6--	--2.6	1,400 [1,100,000[j]]--	--1,400	7.9 [22,000[j]]--	--7.9	[<0.016[j]]--	--	1.4 [<4.6[j]]--	--1.4	5.9 [9,300[j]]--	5.9	(<0.38) [<11[j]]--	--(<0.38)
Greenstone[f]	100--	--100	3.3--	--3.3	970 [940,000[j]]--	--970	11 [44,000[j]]--	--11	[<0.016[j]]--	--	0.37 [<4.6[j]]--	--0.37	3.5 [5,800[j]]--	3.5	(<0.38) [<11[j]]--	--(<0.38)
Basin Plan Objective	**--**	**500**[c]	**--**	**250**[c]	**--**	**300**[c]	**--**	**50**[c]	**--**	**0.025**[d]	**--**	**50**[e]	**--**	**52**[d,h]	**--**	**5.0**[d]

a As reported in RWQCB (2007a); samples collected in Jun 02, Apr 02, and Jan 03.
b As reported in Golder Associates (2011) and SES (2011); samples collected in Feb 09, Apr 09, Sep/Oct 09, and Jan 10 (HG-10S only sampled in Sep/Oct 09 and Jan 10).
c Water quality objective for municipal supply, secondary Maximum Contaminant Level (MCL) (RWQCB, 2007c).
d Water quality objective for freshwater water quality, 4-day average (RWQCB, 2007c).
e Water quality objective for agricultural supply (RWQCB, 2007c).
f As reported in SES, (2011); sampled on November 24, 2009.
g As reported in SES, (2011); sampled on January 13, 2010.
h The objective for nickel is based on hardness. The objective value assumes a hardness of 100 mg/l calcium carbonate ($CaCO_3$).
i As reported in ESA (2011); samples collected on February 16, 2011 and March 24, 2011.
j Value represents the TOTAL metal concentration for the sample.
k Sample represents shallow, concentrated sheet flow from a Quarry road; the sample is not representative of non-road areas within the EMSA and, for this location, there are additional probable sources of metals and other inorganic constituents besides the waste rock (e.g., fluids/residues from heavy machinery and trucks).
l Violet creek Tributary, south of WMSA. Sampling conducted by Lehigh, April 7, 2010 (Lehigh, 2010)
m Pond 4 retention pond, adjacent to Quarry pit. Sampling conducted by Lehigh, April 7, 2010 (Lehigh, 2010)
n County Access Road Bridge. Sampling conducted by Lehigh, April 7, 2010 (Lehigh, 2010)
o Results for wall washing in [ ] presented as total recoverable
p The individual or "discrete" sample result was included where ranges were not used.

mg/l = milligrams per liter
µg/l = micrograms per liter
ND= not detected

* HG = High grade limestone; MHG = Medium to High grade limestone; MLHG = High and Medium/low grade limestone
** Values in ( ) are non-detect with indicated detection limits.

SOURCE: ESA, 2011; SES, 2011; Golder Associates, 2011; RWQCB, 2007c

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general minerals and other constituents from these materials. Leachability was determined using the Modified California Assessment Manual Waste Extraction Test (CAM WET) and wall washing tests. Quarry water runoff from the west wall of the Quarry pit also was analyzed for those constituents. Results of these tests are presented in **Tables 4.10-3** and **4.10-4**.

Total concentrations of selenium and various metals in rock from boring samples collected in the Quarry pit and the area of a formerly proposed South Quarry[10] varied by rock type (see Table 4.10-3). Selenium concentrations in composite boring samples of greywacke (10 milligrams per kilogram (mg/kg)), limestone (8.5 mg/kg), fault breccia (15 mg/kg), greenstone (15 mg/kg), and metabasalt (13 mg/kg) were notably higher than in chert (2.4 mg/kg) from the previously proposed South Quarry location. Individual samples of limestone from the Quarry pit indicate that limestone is heterogeneous with respect to selenium content; selenium concentration ranged from not detected (<0.76 mg/kg) to 6.6 mg/kg. This is thought to be due to different grades of limestone. The composite sample data are considered better indicators of average bulk conditions because of those variations among the types of limestone and because the composite samples are more representative of the overall bulk rock composition.

De-ionized water was used in conducting the CAM WET tests on the composite samples from the formerly proposed South Quarry (see Table 4.10-4). Results of these tests indicated that the limestone contains relatively ~~low~~ high concentrations of leachable selenium (6 µg/l from the rock containing 8.5 mg/kg) in comparison to other rock types. However, selenium leachability from the overburden materials (such as greywacke, fault breccia, greenstone, metabasalt and chert) was very limited; all concentrations in water were less than 0.6 µg/l from those rocks, even though selenium concentrations in the rocks were typically higher than in limestone. This phenomenon will be further confirmed by sampling and testing during the backfilling and reclamation period as described in Mitigation measure 4.10-1.

Wall washing tests performed on exposed faces within the Quarry pit by Golder (2011) involved washing an approximately one-meter-square area of rock face with an amount of water that was about equivalent to a 0.25-inch rainstorm event. The resultant wash water was analyzed for dissolved and total selenium concentrations to provide an indication of the amount of total recoverable and dissolved constituents that could be leached out during a rainstorm for the various rock types (Table 4.10-2). The total receivable concentrations include the selenium contained in solid particles washed off the walls as well as in the wash water and are therefore higher than the dissolved values, which reflect only the amount of selenium in the wash water.

Similar to the CAM WET results (Table 4.10-4), the dissolved constituent concentrations from the wall wash tests for greywacke, chert, and greenstone (<0.38 µg/l) were very low (Table 4.10-2) compared to the bulk rock concentrations. However, dissolved selenium concentrations in wash water from limestone (0.7, 14, and 49 µg/l in individual samples; SES, 2011) varied greatly and

10 The South Quarry location was sampled because it was being considered as an expansion of the Quarry facilities in a prior reclamation plan amendment proposal, since the limestone formation being mined in the Quarry pit extends into this area. However, the South Quarry is not part of the RPA.

were generally much higher than from other rocks. Similarly, total selenium concentrations in the wash water from limestone (60 to 230 μg/l) were far higher than from the other rock types (all <11 μg/l), probably because there was a substantial amount of suspended sediments in the wash water.

Suspended Sediment

The upper Permanente Creek watershed previously has been documented as having a generally high sediment yield and notable accumulations of fine sediment (Nolan and Hill, 1989; SCVURPPP, 2007). The naturally high sediment yield is attributable, in part, to the underlying geology (i.e., the Franciscan Complex) and steep topography. The Franciscan Complex is generally recognized as producing relatively high sediment yields within Coast Range watersheds. However, activities associated with the Quarry (e.g., overburden stockpiles) previously have been identified as contributing to and increasing the ambient sediment load within the Permanente Creek watershed (Nolan and Hill, 1989; RWQCB, 1999). Nolan and Hill (1989) concluded that the sediment yield (i.e., tons per square mile) in the southern headwater area of Permanente Creek was approximately 3.5 times higher than that which would be expected under natural conditions. This difference was attributed to an increase in the availability of sediment, as opposed to increases or changes in runoff. Within and near the Project Area, Nolan and Hill (1989) noted that landforms susceptible to erosion include several types of active and inactive landslides, gullies, rills, unstable stream banks, bare ground and slopes, spoils and storage piles, and roads. Data presented by Nolan and Hill (1989) suggest that the increase in sediment availability could be attributed, in part, to land disturbances (e.g., bare ground, spoils piles) that were in close proximity to or interfaced with stream channels and related to activities at the Quarry. The RWQCB has previously cited the Quarry, on a number of occasions, for violating water quality standards. The most recent cleanup and abatement order was issued to the Quarry in 1999 (RWQCB, 1999), and a notice of violation was issued to the Quarry as recently as March of 2010; these orders and violations relate primarily to the discharge of sediment-laden stormwater to Permanente Creek. Among other regulatory mechanisms (described below), water quality related to the operation of the Quarry (including the Project site) continues to be regulated by the RWQCB under Cleanup and Abatement Order No. 99-018 (RWQCB, 1999). The Cleanup and Abatement Order relates primarily to the discharge of sediment-laden storm water to Permanente Creek. The principal sources of existing erosion and sediment loading to surface drainages (including Permanente Creek) are Quarry access roads, material piles, and areas which, due to the natural slope and topography, drain directly to Permanente Creek with little attenuation (or storage) of runoff. During storm events, overflow of existing retention ponds is also a notable mechanism of erosion and sediment entrainment (URS, 2010). The Quarry has implemented interim measures as required by the RWQCB to help control erosion and subsequent sediment delivery to Permanente Creek.

Flooding

In the Permanente Creek watershed, floods typically occur during the wet season from November through April. Normally, in the upper watershed, floods are flashy in nature as the time of concentration for tributaries is usually short and stream flows thus respond rapidly to rainfall. The

TABLE 4.10-3
MINED MATERIAL AND OVERBURDEN CONSTITUENT CONCENTRATIONS

Constituent	Units	C-1 SQ Boring Composite Greywacke (7/1/09)	C-2 SQ Boring Composite Limestone (7/1/09)	C-3 SQ Boring Composite Flt. Breccia (7/1/09)	C-4 SQ Boring Composite Greenstone (7/1/09)	C-5 SQ Boring Composite Metabasalt (7/1/09)	GT1-2-08-213 SQ Boring Composite Chert (7/1/09)	Average of Detections for SQ mg/kg	B1-1 NQ Single Sample Limestone (1/22/10)	B1-2 NQ Single Sample Limestone (1/22/10)	B1-3 NQ Single Sample Metavolcan (1/22/10)	B1-4 NQ Single Sample Greywacke (1/22/10)	B2-1 NQ Composite (2/10/10)	Average of Detections for NQ mg/kg	B2-2 EMSA OB Composite (2/10/10)
Antimony	mg/kg	ND (<1.7)	6.5	4.2	ND (<1.7)	ND (<1.7)	5.3	3.09	ND (<1.7)	ND (<1.7)	ND (<1.7)	ND (<1.7)	ND (<1.7)	ND (<1.7)	ND (<1.7)
Arsenic	mg/kg	5.1	8.4	2.4	ND (<0.71)	4.8	5.7	4.46	ND (<0.71)	2.7	ND (<0.71)	7.5	2.7	2.7	2.6
Asbestos	mg/kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Barium	mg/kg	60	800	180	46	110	560	292.7	940	290	590	49	ND (<0.13)	373.8	750
Beryllium	mg/kg	0.17	0.3	ND (<0.026)	ND (<0.026)	0.032	0.11	0.106	ND (<0.026)	ND (<0.026)	ND (<0.026)	ND (<0.026)	ND (<0.026)	ND (<0.026)	ND (<0.026)
Cadmium	mg/kg	0.071	0.068	ND (<0.033)	ND (<0.033)	ND (<0.033)	0.15	0.056	ND (<0.033)	6.5	ND (<0.033)	ND (<0.033)	ND (<0.033)	1.3	ND (<0.033)
Chromium IV	mg/kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Chromium Compounds	mg/kg	95	29	260	400	110	6.6	150.1	ND (<0.045)	30	200	35	130	79.0	110
Cobalt	mg/kg	20	21	34	93	26	8.4	33.7	ND (<0.18)	ND (<0.18)	37	10	27	14.8	23
Copper	mg/kg	50	56	56	45	62	27	49.3	ND (<0.13)	48	47	37	44	35	44
Fluoride Salts	mg/kg	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lead	mg/kg	9.7	6.8	8.3	ND (<0.59)	11	2	6.3	ND (<0.59)	ND (<0.59)	ND (<0.59)	ND (<0.59)	ND (<0.59)	ND (<0.59)	ND (<0.59)
Mercury	mg/kg	0.033	0.15	0.053	ND (<0.014)	ND (<0.014)	ND (<0.014)	0.043	ND (<0.014)	0.77	0.16	ND (<0.014)	0.12	0.21	0.11
Molybdenum	mg/kg	0.22	2.3	ND (<0.18)	ND (<0.18)	1	0.74	0.74	ND (<0.18)	20	ND (<0.18)	ND (<0.18)	ND (<0.18)	4	ND (<0.18)
Nickel	mg/kg	120	120	250	1,200	100	220	335	ND (<0.12)	59	230	71	180	108	150
Selenium	mg/kg	10	8.5	15	15	13	2.4	10.7	ND (<0.76)	6.6	ND (<0.76)	ND (<0.76)	ND (<0.76)	1.6	ND (<0.76)
Silver	mg/kg	ND (<0.086)	0.63	0.13	ND (<0.086)	0.16	ND (<0.086)	0.17	ND (<0.086)	ND (<0.086)	ND (<0.086)	0.86	ND (<0.086)	0.21	ND (<0.086)
Thallium	mg/kg	ND (<0.94)	ND (<0.94)	0.97	ND (<0.94)	ND (<0.94)	ND (<0.94)	0.55	ND (<0.94)	1.2	ND (<0.94)	ND (<0.94)	ND (<0.94)	0.6	ND (<0.94)
Vanadium	mg/kg	64	15	75	53	70	5.9	47.2	ND (<0.062)	560	80	27	67	146.8	56
Zinc	mg/kg	250	67	75	64	71	150	112.8	14	180	73	51	72	78	75

NOTES:
ND = Not detected at the specified detection limit.
When an ND was included in the calculation of an average value, it was assumed to be one half the detection limit.
If all samples were ND, then the lowest detection limit was retained.
SQ = South Quarry

SOURCE: SES, 2011

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TABLE 4.10-4
OVERBURDEN LEACHABILITY BY MODIFIED CAM WET

Constituent (Dissolved)	Units	C-1 SQ Boring Composite Greywacke (7/1/09)	C-2 SQ Boring Composite Limestone (7/1/09)	C-3 SQ Boring Composite Flt. Breccia (7/1/09)	C-4 SQ Boring Composite Greenstone (7/1/09)	C-5 SQ Boring Composite Metabasalt (7/1/09)	GT1-2-08-213 SQ Boring Composite Chert (7/1/09)	Average of Detections for SQ (μg/l)
Antimony	μg/l	7.2	1.5	5.8	0.98	8.5	3.2	4.53
Arsenic	μg/l	3	1.3	6.2	2.7	7.3	1.2	3.6
Asbestos	μg/l	–	–	–	–	–	–	–
Barium	μg/l	59	220	120	37	120	170	121
Beryllium	μg/l	ND (<0.18)	ND (<0.18)	ND (<0.18)	ND (<0.18)	ND (<0.18)	ND (<0.18)	ND (<0.18)
Cadmium	μg/l	ND (<0.13)	ND (<0.13)	ND (<0.13)	ND (<0.13)	ND (<0.13)	ND (<0.13)	ND (<0.13)
Chromium (total)	μg/l	ND (<0.55)	ND (<0.55)	ND (<0.55)	1.9	ND (<0.55)	ND (<0.55)	0.55
Cobalt	μg/l	0.29	0.15	0.13	0.34	0.1	0.25	0.21
Copper	μg/l	1.3	ND (<0.68)	ND (<0.68)	ND (<0.68)	ND (<0.68)	1.2	0.64
Fluoride Salts	μg/l	–	–	–	–	–	–	–
Lead	μg/l	1.2	0.11	ND (<0.054)	ND (<0.054)	0.09	0.12	0.262
Mercury	μg/l	ND (<0.016)	0.21	ND (<0.016)	ND (<0.016)	ND (<0.016)	ND (<0.016)	0.042
Molybdenum	μg/l	11	27	7.3	2.3	28	12	14.6
Nickel	μg/l	1.7	1.7	2	8.1	0.89	3.2	2.93
Selenium	μg/l	ND (<0.38)	6	ND (<0.38)	ND (<0.38)	0.58	ND (<0.38)	1.22
Silver	μg/l	ND (<0.065)	ND (<0.065)	ND (<0.065)	ND (<0.065)	ND (<0.065)	ND (<0.065)	ND (<0.065)
Thallium	μg/l	ND (<0.11)	ND (<0.11)	ND (<0.11)	ND (<0.11)	ND (<0.11)	ND (<0.11)	ND (<0.11)
Vanadium	μg/l	1.5	ND (<1.2)	12	18	4.9	ND (<1.2)	6.27
Zinc	μg/l	22	8.1	11	11	10	37	16.5
Manganese	μg/l	5.2	2.5	7.5	3	3.1	1.2	3.8
Calcium	mg/l	18	16	13	17	11	14	14.8
Magnesium	mg/l	4.3	4.2	6.8	8.3	5.4	14	7.2
Sodium	mg/l	8.8	4.0	7.9	5.9	6.6	2.7	6.0
Potassium	mg/l	3.7	2.8	3.9	0.96	4.1	2.0	2.9
Total Alkalinity	mg/l	37	42	56	76	46	49	51
Chloride	mg/l	1.6	1.1	1.3	2.0	1.3	1.4	1.45
Sulfate	mg/l	22	12	16	3	8.8	29	15.1
pH	number	8.11	8.16	8.24	8.29	8.36	8.27	8.2
EC	μmhos/cm	160	130	160	160	130	190	155

NOTES:
ND = Not detected at the specified detection limit.
When an ND was included in the calculation of an average value, it was assumed to be one half the detection limit.
If all samples were ND, then the lowest detection limit was retained.
SQ = South Quarry

SOURCE: SES, 2011

Federal Emergency Management Agency (FEMA) is responsible for mapping areas subject to flooding during a 100-year flood event (i.e., a flood event that has a 1 percent chance of occurring in a given year). According to FEMA (2007), the 100-year flood hazard zone for Permanente Creek extends upstream to a point within the Quarry site approximately adjacent to the aluminum plant (Figure 4.10-1). Within and near the Quarry site, the 100-year flood hazard zone for Permanente Creek is relatively narrow, extending only a few hundred feet across (i.e., 200 to 300 feet). Just downstream of Permanente Road, the magnitude of the 100-year flood peak in Permanente Creek is approximated to be 1,480 cfs (FEMA, 2009).

4.10.1.3 Groundwater Hydrology

Within the Project Area, groundwater flows through two general formations (or mediums): bedrock, and a small portion of the Santa Clara valley aquifer that intersects the Quarry site. The Project area is underlain by bedrock of the Franciscan Complex, which is a chaotic mix of highly deformed, ancient marine sediments and crustal rocks. The occurrence of groundwater throughout the Franciscan Complex is almost exclusively within secondary openings such as joints, fractures, shear zones and faults within the bedrock (Golder Associates, 2011). In general, the bedrock has a relatively low permeability, yet the specific value (or rate) varies locally across the different bedrock units (i.e., within the limestone, greenstone, etc.). Over the eastern portion of the EMSA, the Santa Clara Formation, a more permeable deposit of unconsolidated to slightly consolidated conglomerate, sandstone, siltstone, and claystone, lies above the bedrock of the Franciscan Complex. This portion of the EMSA (i.e., the part comprising part of the Santa Clara Formation) overlies the western margin of the Santa Clara Subbasin, which is part of the larger Santa Clara Valley Groundwater Basin (DWR, 2004). The Santa Clara Formation is exposed only on the west and east sides of the Santa Clara valley.

Regionally, the direction of groundwater flow is interpreted to be from west to east, flowing from the topographic high at Black Mountain toward the Santa Clara Valley (Golder Associates, 2011). Locally, groundwater discharges to Permanente Creek, Monte Bello Creek (to the south, a tributary to Swiss Creek and then Stevens Creek), and an unnamed creek, referred to as Wild Cat Canyon Creek, in the eastern half of the Quarry (a tributary to Permanente Creek) (Golder Associates, 2011). Groundwater also discharges to the Quarry pit. Adjacent to the Project Area, the typically perennial reaches of Permanente Creek (i.e., upstream and downstream of the Quarry Pit) are maintained primarily by groundwater discharging directly to the stream channel during the dry season, as well as by dewatering discharges from the Quarry pit.

A number of geotechnical borings were excavated across the EMSA, generally to a depth of 45 feet below ground surface (bgs). Groundwater was not encountered in any of the boreholes (Golder Associates, 2009). The portion of the EMSA closest to Permanente Creek (i.e., the eastern edge) is approximately 100 feet above the channel bed. Subsequent investigations further upstream on Permanente Creek (near the Main Pit) have shown fall (October 2009) groundwater elevations near the creek to be 50 to 90 feet above the bed elevation of the creek (Golder Associates, 2011).

Groundwater Quality

For the Santa Clara Sub-basin, the groundwater in the major producing aquifers within the basin is generally of a bicarbonate type, with sodium and calcium the principal cations (DWR, 1975, *as cited by* DWR, 2004). Although hard (i.e., having high hardness or carbonate values), it is of good to excellent mineral composition and suitable for most uses. Drinking water standards are met at public supply wells without the use of treatment methods (SCVWD, 2001, *as cited by* DWR, 2004).

The different bedrock units underlying the Project Area (i.e., the limestone, greenstone, and greywacke) are known to produce measureable concentrations of trace metals, particularly if the metals occur within sulfide deposits, which tend to weather rapidly when in contact with oxygenated water. Groundwater quality information was collected in the area to the south of the Quarry pit and on the south side of Permanente Creek. This information is reflective of the quality and chemical characteristics of the groundwater that comes into contact with the various, principal bedrock units underlying the entire Project Area. Based upon groundwater samples taken at five monitoring wells (HG-4, HG-6, HG-7, HG-9, and HG-10; see Figure 4.10-2), groundwater quality generally meets the relevant objectives within the Basin Plan, with the exception of TDS, sulfate, iron, manganese, and molybdenum (Table 4.10-2). Average mercury concentrations in the groundwater from all wells that were sampled more than once also meet the objectives for 1-hour maximum ~~(2.4 µg/l)~~ for protection of aquatic organisms (2.4 µg/l) and the Water Quality Objective for drinking water (2 µg/l); the single sample from well HG-10 (0.063 µg/l) exceeded the objective for protection of aquatic organisms (0.025 µg/l). However, these constituents are likely naturally elevated in groundwater due to the mineralized nature of the bedrock (SES, 2010).

4.10.1.4 Regulatory Setting

The following section provides a brief summary of the federal, state, and local water quality- and hydrology-related regulations, goals and policies relevant to the Project.

Federal Regulations

Federal Emergency Management Agency

Under Executive Order 11988, FEMA is responsible for the management and mapping of areas subject to flooding during a 100-year flood event (i.e., an event with a one percent chance of occurring in a given year). FEMA requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. The proposed Project area does not fall within the 100-year floodplain delineated by FEMA (2007).

Federal and State Water Quality Policies

The statutes that govern Project activities and operations that may affect water quality are the CWA (33 U.S.C. §1251) and the Porter-Cologne Water Quality Control Act (Porter-Cologne) (Water Code §13000 et seq.). These acts provide the basis for water quality regulation in the Project Area.

The California legislature has assigned the primary responsibility to administer and enforce statutes for the protection and enhancement of water quality to the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs). 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 regulations. The nine RWQCBs throughout California adopt and implement water quality control 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 RWQCB adopts and implements a Water Quality Control Plan that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan (Water Code §§13240-13247).

The National Toxics Rule and the California Toxics Rule

Federal water quality criteria for priority toxic pollutants have been established for non-ocean surface waters (including enclosed bays and estuaries) of California by the USEPA (state water quality objectives for priority pollutants have also been established by some RWQCBs in their respective water quality control plans [Basin Plans]; Basin Plans are discussed in further detail below). Federal priority toxic pollutant criteria have been promulgated for California by the USEPA in the 1992 (amended in 1995) National Toxics Rule (NTR; 40 CFR 131.36) and in the 2000 California Toxics Rule (CTR; 40 CFR 131.38). For California, the criteria in the CTR supplement the criteria in the NTR (i.e., the CTR does not change or supersede any criteria previously promulgated for California in the NTR) (SWRCB, 2000). The USEPA disseminated the CTR in order to fill a gap in California water quality standards created in 1994 with a court ruling that overturned the State's water quality control plans. Except as specified in the CTR, the federal criteria apply to all waters assigned any aquatic life or human health beneficial uses as designated in the Basin Plans. The CTR establishes ambient aquatic life criteria for 23 priority toxics, ambient human health criteria for 57 priority toxics, and a compliance schedule provision which authorizes the State to issue schedules of compliance for new or revised National Pollutant Discharge Elimination System (NPDES) permit limits based on the federal criteria when certain conditions are met (USEPA, 2010). California must use these criteria, together with existing water quality standards when controlling pollution in inland surface waters, enclosed bays, and estuaries.

Beneficial Use and Water Quality Objectives (CWA §303)

The RWQCB is responsible for the protection of the beneficial uses of waters within the San Francisco Bay region, including the Project Area. The RWQCB uses its planning, permitting, and enforcement authority to meet this responsibility and has adopted the Basin Plan (RWQCB, 2007c) to implement plans, policies, and provisions for water quality management.

In accordance with state policy for water quality control, the RWQCB employs a range of beneficial use definitions for surface waters, groundwater basins, marshes, and mudflats that serve as the basis for establishing water quality objectives and discharge conditions and prohibitions. The Basin Plan has identified existing and potential beneficial uses supported by the key surface water drainages throughout its jurisdiction (RWQCB, 2007c). The beneficial uses of any specifically identified water body generally apply to all its tributaries (RWQCB, 2007c). Beneficial uses identified for water bodies within and near the Project Area are summarized in **Table 4.10-5**. Existing and potential beneficial uses in both the Permanente Creek and Stevens Creek watersheds include cold water and wildlife habitat, fish spawning, and contact and non-contact water recreation. The Stevens Creek watershed also includes warm water habitat, fish migration, and freshwater replenishment as designated beneficial uses. The beneficial uses of groundwater in the Project Area include drinking water, industrial process and service water supply, and agricultural use.

TABLE 4.10-5
DESIGNATED BENEFICIAL USES OF WATER BODIES IN THE PROJECT AREA

Water Body	Designated Beneficial Uses
Surface Waters	
Permanente Creek	COLD, SPWN, WILD, REC-1, REC-2
Stevens Creek	COLD, MIGR, SPWN, WARM, WILD, REC-1, REC-2
Groundwater Basins	
Santa Clara Valley, Santa Clara Subbasin	MUN, PROC, IND, AGR

NOTES:
Beneficial Uses Key:
MUN (Municipal and Domestic Water Supply); PROC (Industrial Process Water Supply); IND (Industrial Service Water Supply); AGR (Agricultural Water Supply); COLD (Cold Freshwater Habitat); MIGR (Fish Migration); SPWN (Fish Spawning); WARM (Warm Freshwater Habitat); WILD (Wildlife Habitat); REC-1 (Body Contact Recreation); REC-2 (Noncontact Recreation).

On July 14, 2010, the California Regional Water Quality Control Board adopted Resolution No. R2-2010-0100, which amended the designated beneficial uses in the Basin Plan. This resolution added the beneficial uses of groundwater recharge, the preservation of rare and endangered species, and warm freshwater habitat to Permanente Creek. The resolution has been submitted to the Office of Administrative Law and the U.S. EPA for review and approval.

SOURCE: RWQCB, 2007c

The Basin Plan also includes water quality objectives that are intended to be protective of the identified beneficial uses (RWQCB, 2007c); the beneficial use designation and the accompanying water quality objectives collectively define the water quality standards for a given water body or region. Under CWA §303(d), the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. As described above (see Table 4.10-1), existing and proposed impairments for Permanente Creek include diazinon, toxicity, and selenium. Existing impairments for Stevens Creek included diazinon and toxicity. Throughout the Bay Area, diazinon pollution of surface water is currently being addressed by a TMDL (RWQCB, 2005). For toxicity, the Basin Plan (RWQCB, 2007c) states that all waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species (RWQCB, 2007c). For selenium, the Basin Plan water quality objective is 5 µg/l (4-day average) (RWQCB, 2007c), which is the criteria promulgated in the NTR. A TMDL has not yet been established by the RWQCB for selenium.

Federal and State Antidegradation Policy

The federal antidegradation policy is found in Clean Water Act Section 303(d) and Title 40 CFR Section 131.12. The goals of the policy are to ensure that no activity will lower water quality to support existing uses, and to maintain and protect high quality waters. Under the policy's three-tiered structure, Tier 1 protects existing uses, Tier 2 maintains high quality waters by avoiding or minimizing reductions in the water quality of waters that exceed standards, and Tier 3 strictly protects outstanding natural resource waters by not allowing any degradation at all. Review under the policy is triggered by approvals such as wastewater discharge permits.

California's antidegradation policy is found in SWRCB Resolution No. 68-16, Policy with respect to Maintaining High Quality of Waters in California, which states:

> *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

Resolution No. 68-16 restricts reductions in the quality of surface water or groundwater even when such reductions would allow for beneficial uses to be protected. Consistent with the policy, an adverse change in water quality is allowable only if: (1) it is consistent with maximum benefit to the people of the State, (2) it does not unreasonably affect present and anticipated beneficial uses, and (3) it does not result in water quality less than that prescribed in water quality control plans or policies.

Water Quality Certification (CWA §401)

Section 401 of the CWA requires that an Applicant for any federal permit (e.g., a CWA §404 permit) obtain certification from the state that the permitted action (e.g., discharge of fill) will comply with the other provisions of the CWA and with state water quality standards. For example, before the U.S. Army Corps of Engineers (USACE) can issue a §404 permit, it must certify, under §401, that the permitted action meets state water quality standards. For the Project Area, the RWQCB must provide the water quality certification required under CWA §401. Water quality certification under CWA §401, and the associated requirements and terms, is necessary in order to minimize or eliminate the potential water quality impacts associated with the action(s) requiring a federal permit. The Applicant would contact the relevant federal agency(s) in order to determine whether a federal permit would be required. If a federal permit is required, then the Applicant would be required to obtain water quality certification from the RWQCB. CWA §401 and §404 also are discussed in Section 4.4, *Biological Resources*.

National Pollutant Discharge Elimination System Program (CWA §402)

The CWA was amended in 1972 to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a NPDES permit. In 1987, amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES program. In November of 1990, the USEPA published final regulations that also establish NPDES permit application requirements for discharges of stormwater from construction projects that encompass 5 acres of more of soil disturbance. Regulations (the Phase II Rule) that became final on December 8, 1999, expanded the existing NPDES program to address stormwater discharges from construction sites that disturb land equal to or greater than 1 acre and less than 5 acres (small construction activity).

Santa Clara Valley Urban Runoff Pollution Prevention Program

The SCVURPPP is an association of 13 cities and towns in Santa Clara valley, the County, and the Santa Clara Valley Water District (SCVWD) which shares a common NPDES permit to discharge stormwater to South San Francisco Bay (SCVURPPP, 2010). In addition to the County, member agencies (co-permittees) include Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, Sunnyvale, and the SCVWD. The program is organized, coordinated, and implemented in accordance with a Memorandum of Agreement (MOA) signed by each co-permittee (SCVURPPP, 2010). The SCVURPPP has conducted monitoring in local creeks within its program area since 2002 in order to comply with requirements specified in its NPDES permit, which was issued in 2001 by the RWQCB.

General Industrial Permit (SWRCB Order No. 97-03-DWQ)

For stormwater discharges associated with industrial activities, the SWRCB has adopted the Industrial Storm Water General Permit, SWRCB Order 97-03-DWQ (General Industrial Permit). This permit regulates discharges associated with 10 broad categories of industrial activities, including hard rock and aggregate mining. Existing operations at the Quarry, as well as those activities proposed as part of the Project, are and would be regulated under the General Industrial Permit (or an equivalent or more specific individual NPDES permit, as determined by the RWQCB). Discharges of stormwater associated with industrial activities are authorized by the General Industrial Permit, which is issued under both State (i.e., Waste Discharge Requirements, or WDRs) and federal (i.e., NPDES) water quality regulations. The General Industrial Permit serves to cover the operational life of an industrial activity, and it requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) in order to reduce or eliminate stormwater pollutants associated with industrial activity. The General Industrial Permit also requires the development of a stormwater pollution prevention plan (SWPPP) and a monitoring program. Within the SWPPP, sources of pollutants are to be identified and the means to manage these sources to reduce stormwater pollution are to be described (e.g., best management practices [BMPs]). The General Industrial Permit also requires that an annual report be submitted by July 1 of each year. However, the RWQCB issued a letter February 18, 2011, regarding the NOV issued March 2011 and determining that the facility cannot operate under their current Industrial Storm Water Permit.

The most recent SWPPP for the Quarry, which includes a Storm Water Monitoring Program (SWMP), was submitted to the RWQCB in March of 2010 (URS, 2010). Controlling erosion and subsequent delivery of sediment to Permanente Creek is the primary focus of the SWPPP (URS, 2010). Currently, stormwater runoff is sampled at multiple locations throughout the Quarry and the results are submitted to the RWQCB on an annual basis; the sampling locations include drainage basins and channels within the Quarry (e.g., sediment basins/ponds) as well as locations within the Permanente Creek channel, including at points downstream of the EMSA.

Hazardous Materials and Spill Prevention Control and Countermeasure Plan

The Aboveground Petroleum Storage Act of 1990 requires facilities storing petroleum products in a single tank greater than 1,320 gallons, or facilities storing petroleum in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons, to file a storage statement with the SWRCB and prepare a spill prevention, control, and countermeasure plan. The plan must identify appropriate spill containment measures or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training. Other hazardous materials which are used or stored at the Quarry include motor oil (new and used), diesel fuel, and lubrication oil. All of these materials, with the exception of the Quarry diesel fuel tank, which is stored in a double walled tank in secondary containment, and the warehouse standby generator diesel fuel tank, are stored with a cover and therefore have a low-to-very low likelihood of stormwater contact (URS, 2010).

Surface Mining and Reclamation Act of 1975

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 will be available to accomplish reclamation (Pub. Res. Code §2770). This plan must be prepared by a mining Applicant prior to initiation of mining activities. SMARA is administered by lead agencies (most often counties or cities) and the California Department of Conservation. The County is the SMARA Lead Agency for this Project. SMARA contains a number of provisions addressing geotechnical and slope stability issues (see Section 4.7, *Geology, Soils, and Seismicity*, for further detail) as well as drainage diversion structures, waterways (14 California Code of Regulations (CCR) §3706) and stream protection including surface and groundwater (14 CCR §3710). SMARA also dictates that erosion control methods shall be designed for the 20-year storm, and shall control erosion and sedimentation. This is applicable to operations in the EMSA as well as after reclamation is complete in the EMSA (Chang Consultants, 2009a). The SMARA regulations also require reclamation plans to include performance standards for drainage and erosion to protect water quality, including streams, surface and groundwater. These performance standards must ensure compliance with the CWA and Porter-Cologne and other legal requirements (14 CCR §§3706, 3710).

SWRCB Mining Waste Management

The SWRCB has promulgated Mining Waste Management Regulations (27 CCR §22470 et seq.) that apply to all owners or operators of a waste management unit for the treatment, storage, or disposal of mining waste (Mining Unit); mining waste includes overburden and waste rock.[11] As such, Mining Units include waste piles (27 CCR §22470 (a)) and the EMSA would be considered a Mining Unit as defined in the Mining Waste Management Regulation (27 CCR §22470 et seq.). These regulations are administered by the RWQCB through the issuance of WDRs unless these requirements are waived by the RWQCB. Due to the presence of non-hazardous, soluble pollutants (e.g., selenium) (see Table 4.10-2), the overburden materials in the Project Area, which contain limestone material, would likely be categorized as Group B mining wastes as defined within these regulations.[12] Accordingly, the Applicant would be required to implement certain siting and construction standards, including peak stream flow protection, precipitation and drainage controls, and a leachate collection and removal system (LCRS). A LCRS has specific requirements that are outlined within the Mining Waste Management Regulations (27 CCR §20340 (b) through (e)).

Porter-Cologne Water Quality Control Act

Porter-Cologne (Water Code §13000 et seq.) is the basic water quality control law for California. California's water quality laws are administered by the SWRCB and locally by the nine RWQCBs, within a framework of statewide coordination and policy. The SWRCB establishes statewide policy for water quality control and provides oversight of the RWQCBs' operations. Porter-Cologne and the CWA overlap in many respects, as the entities established by Porter-Cologne are in many cases enforcing and implementing federal laws and policies. The RWQCBs implement both the Federal Clean Water Act and the State's Porter-Cologne Water Quality Act through permitting processes and the enforcement of water quality laws. In addition to other regulatory responsibilities, the RWQCBs have the authority to conduct, order, and oversee investigation and cleanup where discharges or threatened discharges of waste to waters of the State could cause pollution or nuisance, including impacts to public health and the environment. The responsibilities of RWQCB includes jurisdiction over discharges from mining operations.

Specific to the Permanente Quarry, the RWQCB, San Francisco Region, maintains jurisdiction over the quality of discharges from that facility. In June 2011, the RWQCB issued a Water Code §13267 Order to Lehigh that presented a comprehensive plan to address discharges from the Permanente facility so as to ensure compliance with the Porter-Cologne Water Quality Control Act, the Federal Clean Water Act ~~Ac,t~~ and applicable water quality standards. Deadlines in this Order were slightly amended via July 2011 correspondence. In accordance with this plan, process-related discharges from the Quarry were authorized in October and November 2011 by the RWQCB pursuant to the General NPDES Permit for Aggregate Mining, Sand Washing, and Sand Offloading operations, Order No. R2-2008-0011 ("Sand & Gravel Permit"). A Report of Waste Discharge was subsequently submitted to the RWQCB by Lehigh on November 30, 2011,

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[11] Mining waste is waste from the mining and processing of ores and mineral commodities. Mining waste includes: (1) overburden; (2) natural geologic materials which have been removed or relocated but have not been processed (waste rock); and (3) the solid residues, sludges, and liquids from the processing of ores and mineral commodities (27 CCR §22480 (a)).

[12] Group B mining wastes include: mining wastes that consist of or contain non-hazardous soluble pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state (27 CCR §22480 (b)). The Applicant expects the cap materials for the overburden areas to be categorized as Group C mining wastes.

for purposes of obtaining an individual NPDES Permit for the facility that will specifically regulate pollutants of concern, namely, selenium. The Regional Water Board is in the process of preparing and issuing that NPDES permit, and a comprehensive monitoring plan was submitted to the RWQCB by Lehigh on October 20, 2011 to support its issuance. Via this process, the discharge will be in compliance with the Porter-Cologne Water Quality Control Act, the Federal Clean Water Act, and applicable water quality standards.

Under current RWQCB requirements, the Applicant must:

- Continue to maintain and pursue all appropriate permits and authorizations through the RWQCB, including the issuance of a NPDES Permit that will reduce or remove selenium to levels consistent with all applicable Basin Plan or other water quality standards.
- Comply with requirements set forth by the RWQCB in the Water Code §13267 Order, the Sand & Gravel Permit authorizations, and in the upcoming issued individual NPDES Permit.
- Follow any directions or proposed measures imposed by the RWQCB that will improve its performance sufficiently to meet the performance criteria if annual surface water monitoring indicates that discharges from the Quarry exceed applicable effluent or receiving water limitations specified in the upcoming individual NPDES Permit.
- Maintain procedures to ensure prompt identification and repair of damage to BMPs or structural control facilities, especially after large storm events.
- Conduct routine inspection and maintenance of BMPs, structural control facilities, and outfalls. If inspections reveal that BMPs, structural control facilities, and/or outfalls are damaged, corrective actions must be implemented immediately.

Waste Discharge Requirements

Actions that involve, or are expected to involve, discharge of waste are subject to water quality certification under CWA §401 (e.g., if a federal permit is being sought or granted) and/or WDRs under Porter-Cologne. Chapter 4, Article 4 of Porter-Cologne (Water Code §§13260-13274) states that persons discharging or proposing to discharge waste that could affect the quality of waters of the state (other than into a community sewer system) shall file a Report of Waste Discharge (ROWD) with the applicable RWQCB. For discharges directly to surface water (waters of the United States) an NPDES permit is required, which is issued under both state and federal law. For other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the State (such as isolated wetlands, creek banks above OHW, or seasonal, intermittent, and ephemeral streams that lack a hydrologic nexus to navigable waters), WDRs are required and are issued exclusively under state law. WDRs typically require many of the same BMPs and pollution control technologies as those that are required by NPDES-derived permits. Further, the WDRs application process is generally the same as for CWA §401 water quality certification, though in this case it does not matter whether the particular project is subject to federal regulation.

As previously described, existing operations at the Quarry, as well as those activities proposed as part of the Project, are and would be regulated under the General Industrial Permit. Discharges of stormwater associated with industrial activities are authorized by the General Industrial Permit, which is issued under both State (i.e., WDRs) and federal (i.e., NPDES) water quality regulations. As such, the Project would be subject to WDRs and regulated under the existing provisions of the Industrial General Permit (or an equivalent or more specific individual NPDES permit or WDRs, as determined by the RWQCB), and any wastewater discharges as a result of the Project would be required to be consistent with the water quality objectives defined in the Basin Plan (RWQCB, 2007c).

County of Santa Clara Plans, Policies, and Ordinances

General Grading and Erosion Control Standards

The County's policies and standards pertaining to grading and erosion control are contained in Title C, Division C12, Chapter III of the County of Santa Clara Ordinance Code. The consulting geologist shall provide verification to the County Geologist that all of the recommendations presented in the geologic investigation reports have been incorporated into the plans prior to approval of final improvement plans. The required grading would be carried out in accordance with the requirements set forth by the County Land Development Engineering Office and the County Grading Ordinance. At the time of construction, all graded areas shall be reseeded in conformance with the County Grading Ordinance to ensure that the Project would minimize the potential for erosion on the site. All other land use and engineering aspects of this Project would be conditioned by the recommendations set forth by the County Land Development Engineering Office.

As defined in the County Grading Ordinance, grading associated with surface mining and reclamation activities and covered by an approved reclamation plan is exempt for grading permit requirements.

Surface Mining Ordinance and Surface Mining and Land Reclamation Standards

The County of Santa Clara Zoning Ordinance, §4.10.370, regulates uses classified as *Surface Mining.* In addition, the County Board of Supervisors approved the Surface Mining and Land Reclamation Standards (March 30, 1993) to comply with and implement the provisions of SMARA, by adopting procedures for reviewing, approving, and/or permitting surface mining operations, reclamation plans, and financial assurances in the unincorporated areas of Santa Clara County. The ordinance contains requirements for the content of a reclamation plan, outlines the review procedure, and defines mining standards. The following are applicable standards concerning water quality protection and erosion contained in the ordinance that would apply to the proposed Project:

Protection of Streams and Water-Bearing Aquifers

- Commercial excavations shall be conducted in a manner so as to keep adjacent streams, percolation ponds, or water-bearing strata free from undesirable obstruction, silting, contamination, or pollution of any kind. The objective is to prevent discharges which would result in higher concentrations of silt than existed in offsite water prior to mining operations;

- The removal of vegetation and overburden in advance of surface mining shall be kept to a minimum;

- Stockpiles of overburden and minerals shall be managed to minimize water and wind erosion;
- Erosion control facilities such as detention basins, settling ponds, (de-silting and energy dissipaters) ditches, stream bank stabilization and diking, shall be constructed and maintained as necessary to control erosion:
- The County of Santa Clara Planning Commission (Planning Commission) may restrict excavation in the natural or artificially enlarged channel of any river, creek, stream or natural or artificial drainage channel when such excavation may result in the deposit of silt therein;
- Excavations which may penetrate near or into usable water-bearing strata will not reduce the transmissivity or area through which water may flow unless approved equivalent transmissivity or area has been provided elsewhere, nor subject such groundwater basin or sub-basin to pollution or contamination;
- Maximum depth of excavation shall not be below existing streambed or groundwater table except in such cases where the reclamation plan indicates that a lake or lakes will be part of the final use of the land or where such plan indicates that adequate fill to be used to refill such excavation to conform to the approved reclamation plan. Such plan to be subject to review and approval of the RWQCB and local flood control and water district agencies prior to initiation of excavation.

Erosion and Drainage

Grading and revegetation shall be designed to both prevent excessive erosion and to convey surface runoff to natural drainage courses or interior basins designed for water storage. Lakes, ponds, streams, or other bodies of water may be created within an excavation only when created in accordance with the reclamation plan approved by the County of Santa Clara Planning Commission (Planning Commission) and after considering the recommendations of the County Environmental Health Department, SCVWD, and other affected public agencies. Final surfaces shall be treated to prevent erosion unless otherwise specifically permitted by the Planning Commission.

County of Santa Clara Drainage Manual (2007)

The *Santa Clara County California Drainage Manual 2007* (County of Santa Clara, 2007) (Drainage Manual) sets forth County administrative policy for stormwater drainage design. The Office of Development Services prepared the Drainage Manual to provide a framework for the various hydraulic and hydrologic analyses necessary to plan and design stormwater drainage and flood control facilities within the County. Consistent design and evaluation criteria for stormwater drainage systems help the Office of Development Services and other agencies review stormwater drainage and flood protection designs and impact statements for projects throughout the County, both within and outside of incorporated areas (County of Santa Clara, 2007). The Drainage Manual identifies multiple design standards, methods of analyses, and engineering tools required for the planning and design of stormwater drainage systems and flood control facilities within the County. With respect to conveyance capacities, the Drainage Manual indicates that new stormwater drainage systems and channels shall be designed to convey the 10-year storm without surcharge, and a safe release shall be provided for the 100-year flow (Chang Consultants, 2009a).

County of Santa Clara General Plan (1994)

The Santa Clara County General Plan (County of Santa Clara, 1994) identifies the following policy relevant to the proposed Project and pertaining to water quality and hydrology:

> ***Policy C-RC 20*****:** Adequate safeguards for water resources and habitats should be developed and enforced to avoid or minimize water pollution of various kinds, including: a. erosion and sedimentation; b. organic matter and wastes; c. pesticides and herbicides; d. effluent from inadequately functioning septic systems; e. effluent from municipal wastewater treatment plants; f. chemicals used in industrial and commercial activities and processes; g. industrial wastewater discharges; h. hazardous wastes; and i. non-point source pollution.

4.10.2 Baseline

The baseline established for purposes of analyzing potential impacts to hydrology and water quality reflect the conditions as they existed in June 2007, the year the first NOP of an EIR to analyze impacts of a proposed amendment of the Applicant's existing, approved reclamation plan was published. The regulatory framework described above, the physical characteristics of the site drainage, and site operations have not changed significantly since 2007 but many of the surface water and groundwater samples used the analysis of this project were obtained after 2007. However, given that overall conditions have not changed significantly since 2007, the water quality data provided by the post-2007 water samples are considered representative of 2007 site conditions and thus appropriate for this analysis.

4.10.3 Significance Criteria

Consistent with the County's Environmental Checklist and Appendix G of the CEQA Guidelines, the Project would have a significant impact if it would:

a) Violate any water quality standards or waste discharge requirements;

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge 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 which would not support existing land uses or planned uses for which permits have been granted);

c) Substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or sedimentation on- or offsite;

d) Substantially alter the existing drainage pattern of a 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 which would result in flooding on- or offsite;

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

f) Otherwise substantially degrade water quality;

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or inundation by seiche, tsunami, or mudflow.

j) Be located in an area of special water quality concern (e.g., the Los Gatos or Guadalupe Watershed);

k) Be located in an area known to have high levels of nitrates in well water;

l) Result in a septic field being constructed on soil where a high water table extends close to the natural land surface;

m) Result in a septic field being located within 50 feet of a drainage swale, 100 feet of any well, water course or water body, or 200 feet of a reservoir at capacity;

n) Conflict with Water Collaborative Guidelines and Standards for Land Uses Near Streams

4.10.4 Discussion of Criteria with No Hydrology and Water Quality Impacts

As discussed below, implementation of the Project would cause no effect on criteria b), g), i), k), l), m), or n). Because the Project could cause impacts related to the remaining criteria, they are analyzed in Section 4.10.5.

b) The Project would not substantially deplete groundwater supplies, interfere substantially with groundwater recharge, or adversely affect groundwater quality.

Groundwater at the Quarry has been altered from the pre-mining condition by the excavation of the Quarry pit. Groundwater that once discharged to Permanente Creek is now at least partially captured and flows into the Quarry pit. This condition has caused changes to the pre-mining, perennial flow condition of the creek, resulting in intermittent flow in some areas adjacent to the Quarry pit. Water that is captured by the Quarry pit is now collected and pumped back into the creek. The proposed RPA involves the backfilling of the Quarry pit to an elevation of 990 amsl. Groundwater modeling has indicated that this reclaimed condition would cause groundwater to discharge to Permanente Creek and this recharge is expected to reverse the existing intermittent flow conditions. Groundwater flow and quality are discussed further in this EIR. There are no active groundwater supply wells within the RPA area. However, groundwater modeling (Golder, 2011) indicated that the proposed Quarry operation and reclamation would not have a significant effect to groundwater levels in supply wells located along Monte Bello Ridge, approximately 1.25 miles from the center of the Quarry pit. The EIR preparers reviewed the modeling results and concur with the conclusion that operation of these wells, or any other nearby wells, would not be adversely affected by the Project.

Elevated concentrations of TDS and sulfate have also been measured in local groundwater wells, in areas just upstream of the EMSA, though overall the groundwater concentrations for these constituents generally meet or are lower than those for surface water (Table 4.10-2). The hydraulic connection between surface water and groundwater concentrations (i.e., how surface water concentrations affect groundwater concentrations, and vice versa), or an accurate estimate of background (or natural) concentrations for these constituents, cannot be established with the existing data. However, given the large size of the Santa Clara Subbasin (i.e., 240 square miles), and the subsequently broad distribution of groundwater recharge areas, constituent concentrations in surface runoff from the relatively small upper Permanente Creek watershed are likely to be readily diluted and have little influence on the overall concentrations throughout the aquifer. Further, as stated above, groundwater recharge is not recognized as a beneficial use for Permanente Creek. For these reasons, it is not expected that the Project would affect groundwater quality downstream of the Quarry.

g) Place Housing or Structures within a 100-Year Flood Hazard Area.

FEMA (2007) has defined a relatively narrow 100-year flood hazard area for Permanente Creek in the vicinity of the site. The flood hazard area extends upstream to a point adjacent to the Quarry. However, the Project would not place housing or structures within this flood hazard area. There is therefore no potential for an impact of this kind and this issue is not discussed further.

i) The Project would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or inundation by seiche, tsunami, or mudflow.

In general, the Project site would not be subject to any significant flood risks. There are no dams located upstream of the Project site. Further, the Project site is beyond the potential influence of seiche or tsunami events. Consequently, these issues are not discussed further. In the context of the proposed Project, a minor mudflow (or mudflow-like event, debris flow, etc.) would only result from a landslide or other type of slope failure. The potential for slope instability and failure is addressed in Section 4.7, *Geology, Soils, and Seismicity*, and is therefore not discussed further in this section.

k) The Project would not be located in an area known to have high levels of nitrates in well water.

The Project does not propose construction of groundwater wells; all other issues concerning groundwater quality are considered and fully addressed herein in the context of water quality standards and Appendix G of the CEQA Guidelines. Therefore, this issue is not discussed further.

l) and m) The Project would not result in a septic field being constructed on soil where a high water table extends close to the natural land surface, or in a septic field being located within 50 feet of a drainage swale, 100 feet of any well, water course or water body, or 200 feet of a reservoir at capacity.

The Project does not propose to construct or relocate a septic field. Therefore, this issue is not discussed further.

n) The Project would not conflict with Water Collaborative Guidelines and Standards for Land Uses Near Streams.

Other than the issues addressed below in the context of Appendix G of the CEQA Guidelines, no other aspects of the Project would conflict with the Water Collaborative Guidelines and Standards for Land Uses Near Streams. Therefore, this issue is not discussed further.

4.10.5 Impacts and Mitigation Measures

Impact 4.10-1: Post-reclamation conditions in the East Materials Storage Area (EMSA), West Materials Storage Area (WMSA), and Quarry pit would increase selenium concentrations in Permanente Creek to levels exceeding baseline conditions and RWQCB Basin Plan objectives. ***(Less than Significant Impact with Mitigation Incorporated)***

As described above, the existing concentrations of a few water quality parameters, as measured within Permanente Creek, local groundwater, and wall washing samples, are relatively high within the Quarry area, and generally exceed the water quality objectives presented in the Basin Plan. Based on the existing information available, it is not clear what fraction of the elevated concentrations of some parameters could be directly attributable to existing Quarry operations, as opposed to naturally high background concentrations resulting from the mobilization of these constituents from the various bedrock units (limestone, greenstone, chert, etc.). Regardless of whether these constituents are naturally elevated, or elevated due in some part to the existing Quarry operations, activities associated with the Project could exacerbate concentrations of these constituents within surface water and, in particular, within Permanente Creek. Mining activities can result in release of metals, both because previously impermeable rocks are broken up and exposed to water, and because sulfide-containing rocks are exposed to oxygen, resulting in rapid alteration and dissolution. The samples taken from EMSA and WMSA runoff, as well as the wall washing samples, serve as surrogates for estimating the potential quality of runoff water that would be generated from the Project, particularly during the interim periods before reclamation is complete and shortly after reclamation (i.e., before establishment of the planned vegetation). The following discussion and analysis is based in large part on the site-specific water quality data summarized in Table 4.10-2.

Measured surface runoff from the WMSA and EMSA contained concentrations of iron, manganese, and nickel that are likely not above background (or natural) concentrations, or that were consistently below the water quality objectives presented in the Basin Plan. Dissolved concentrations of iron and manganese in the surface water, wall washing, and WMSA runoff samples were generally much lower than the dissolved concentrations measured in the groundwater, indicating that the surface water samples were likely lower than the background (or natural) concentrations. Further, the dissolved fractions of the total recoverable amount of nickel, iron, and manganese were very low (less than one percent) in the wall washing and WMSA runoff samples. Thus, it is unlikely that these constituents could be mobilized by surface runoff and, if so, it is likely that they would be readily sequestered in areas that tend to store and accumulate hill slope or fluvial sediments. Total nickel concentrations measured in runoff from the EMSA were similar to those measured within Permanente Creek during the same runoff event, indicating that nickel can be mobilized by surface runoff and potentially delivered to receiving waters. In all but one sample (the exception being the road runoff sample within the EMSA [EMSA 01 Road], see Table 4.10-2)[13], however, the measured nickel concentrations were below the Basin Plan objective.

Concentrations of TDS, sulfate, molybdenum, and selenium in samples from surface runoff and/or Permanente Creek are generally above the water quality objectives outlined in the Basin Plan. No surface water objectives are presented in the Basin Plan for TDS, sulfate, and molybdenum that relate to aquatic life (RWQCB, 2007c). The objectives for TDS and sulfate are based on the municipal or domestic supply, but that is not a designated beneficial use of Permanente Creek. Furthermore, both TDS and sulfate concentrations were higher at SW-1 (upstream location) than at SW-2 (downstream from the pit dewatering discharge), indicating that Quarry pit discharge water does not contribute to exceedance of the Water Quality Objectives. The only applicable objective for molybdenum is associated with agricultural supply, which also is not a designated beneficial use for Permanente Creek. Neither agricultural supply~~,~~ nor municipal supply~~, nor groundwater recharge~~ are designated as surface water beneficial uses for Permanente Creek or Stevens Creek (RWQCB, 2007c).

Measured concentrations of mercury in EMSA runoff and sometimes within Permanente Creek indicate that mercury is being mobilized and transported in surface runoff at levels that sometimes exceed the (4-day average) Basin Plan objective. Yet, unlike the case for selenium, the range of mercury concentrations in surface water samples from the creek ~~were~~ was generally similar to ~~those~~ concentrations measured in groundwater (except for the road runoff sample EMSA 01, see Footnote 13). ~~Further,~~ Although atmospheric deposition is a ~~notable~~ known source of mercury in the environment and cannot be discounted as a potential source at the EMSA, Quarry pit or WMSA, it is likely less significant than geologic sources. As such, the concentrations of mercury measured in runoff from the EMSA and within Permanente Creek cannot be reliably distinguished from background (or natural) concentrations based on the best available information.

Mercury, which occurs naturally in the various rock types and in groundwater, meets the RWQCB Basin Plan Water Quality Objectives ~~Benchmarks~~ for surface water in Permanente Creek apart from one isolated concentration measured at 0.07 µg/l (SES, 2011) and samples SL-23-CR and SL-26-CR, which contained mercury at 0.056 µg/l and 0.52 µg/l, respectively (see Table 4.10-2). These three concentrations only slightly exceed the 0.025 µg/l 4-day average goal and are well below the 2.4 µg/l 1-hour goal. Sampling and analysis of the overburden (non-limestone) material, which would ultimately be used as part of the reclamation cover for limestone rock, has very low total mercury concentrations, ranging from not detected to 0.16 mg/kg. In the mined limestone, the values range from 0.15 to 0.77 mg/kg, which are similar to wetlands standards (0.35 to1.3 mg/kg; Link, 1995). Surface water concentrations at the downstream surface water monitoring station (SW-2) below the Quarry are generally below the

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13 Surface water sample obtained from shallow, concentrated sheet flow from a Quarry road; the sample is not representative of non-road areas within the EMSA and, for this location, there are additional probable sources of metals and other inorganic constituents besides the waste rock (e.g., fluids/residues from heavy machinery and trucks).

Basin Plan ~~benchmark~~ Water Quality Objectives of 0.025 µg/l (concentrations range from 0.00133 to 0.07 µg/l, see Table 4.10-2) (SES, 2011). Considering the generally low background concentrations of mercury in the overburden, limestone material, and in surface water, and additionally, given that the low source concentrations would be further reduced through reclamation source control and dilution through the future drainage systems, mercury in the sediments migrating offsite is likely to be low.

Surface-water data indicate that levels of selenium are currently elevated in Permanente Creek adjacent to and downstream of the Quarry. The concentrations of selenium were measured within Permanente Creek, in local groundwater, from shallow concentrated surface runoff from the EMSA and WMSA, and in samples obtained from wall washing tests. The detected concentrations are relatively high within the Quarry area, and generally exceed the water quality objectives presented in the Basin Plan. The elevated levels appear to be due to selenium-containing runoff from quarry operations but could also be attributable, in part, to naturally occurring selenium from the geologic formations underlying and adjacent to the creek. It is neither possible nor necessary to know precisely what fraction of the elevated selenium concentrations could be directly attributable to existing Quarry operations, and what fraction to high background concentrations mobilized from the selenium-containing bedrock units (i.e., limestone). The samples taken from EMSA and WMSA runoff, as well as the wall washing samples, serve as reasonable surrogates for estimating the potential quality of runoff water that would be generated from the proposed Project, particularly during ongoing reclamation and shortly after reclamation (before establishment of the proposed vegetation).

As discussed in Section 4.10.1, *Setting*, selenium concentrations measured at SW-1 (7.18 µg/l; the upstream Permanente Creek station) were more than an order of magnitude higher than the background sample collected from Monte Bello Creek at SW-3 (0.366 µg/l). Complete water quality results are presented in Table 4.10-2. The effect of the ongoing Quarry pit dewatering discharges on existing Permanente Creek water quality is indicated by the samples collected at SW-2 (the downstream Permanente Creek station), where selenium concentrations ranged from 13 to 81 µg/l. A Quarry pit water sample in January 2010 had a dissolved selenium concentration of 82 µg/l (Golder, 2011), indicating that dewatering is a significant contributing factor with respect to selenium concentrations in Permanente Creek.

East Material Storage Area

Stormwater runoff from the EMSA currently is collected in a series of swales and conveyed to desilting basins before being released to Permanente Creek. The average selenium concentration in water samples collected from EMSA runoff ranged between 7.2 µg/l and 43 µg/l, all exceeding the Basin Plan objective of 5 µg/l. It should be noted that in some cases, these sample results were obtained from drainage channels that were lined with selenium-containing limestone material or contained check dams constructed out of limestone material. Therefore, these sample results may not represent actual concentrations of selenium in stormwater runoff flowing solely from overburden material placed in the EMSA. Nevertheless, it is a reasonable assumption that selenium-bearing limestone materials are present within the waste materials deposited in the EMSA. Of special concern is the fine-grained (clay loam texture and contains a substantially greater amount of silt and clay) discard material from the processing activities at the Rock Plant wash plant. Limestone material is washed before processing and the byproduct of that process is a fine-grained material that is deposited by truck on the EMSA. This material may contain high grade limestone and is considered a potential source of selenium if exposed to stormwater and remobilized by runoff.

EMSA Reclamation

Reclamation at the EMSA would begin upon approval of the Project and the three subphases of its reclamation would require about 9 years for completion. As discussed in Chapter 2, *Project Description*, proposed reclamation of the EMSA would achieve final contours and establish native grass and oak woodland habitats consistent with the surrounding area and topography. Final elevations would range from about 500 feet to 900 feet amsl, and overall slope angles would not exceed 2.6H:1V. These slopes would be composed of 2H:1V slopes, interrupted by 25-foot-wide benches spaced at 40-foot vertical intervals.

In accordance with the RPA, following rough grading, the surfaces of the EMSA would be covered with a foot of run-of-mine, non-limestone material consisting of greenstone, greywacke and chert obtained from the Quarry pit area. These rock types do not contain significant amounts of leachable selenium and would therefore act as a suitable cover ~~cap~~ to separate any reactive limestone materials from surface exposure and limit oxidation—the process that generates selenium in the runoff. The run-of-mine, non-limestone rock would be characterized and hauled to the EMSA reclamation sites during the remainder of mining in the Quarry pit. Overlying the one foot of non-limestone material would be six inches of topsoil blended material to serve as a growth-enhancing ~~media~~ medium installed to support vegetation.

After reclamation, the runoff ~~in~~ from the EMSA would be routed in ditches across the slope benches to perimeter ditches and then through swales and down-drains to seven desilting basins located around the EMSA. The system of cross ditches, perimeter ditches, swales and down-drains would route flows to a final basin located at the toe of the EMSA. From this basin, flows would be released to Permanente Creek.

Once limestone materials in the EMSA are covered with run-of-mine, non-limestone rock and vegetated, and the surface water drainage and management controls are in place, the concentrations of selenium entering Permanente Creek from EMSA runoff would be expected to meet Basin Plan Water Quality Objective values because the exposed limestone surfaces would be covered and runoff would occur over a non-limestone, vegetated surface. This is a reasonable prediction if the cover materials achieve the stated goal of preventing stormwater from coming into contact with reactive limestone material that could release soluble selenium. However, the performance of the non-limestone cover would be effective in reducing stormwater contact with limestone only if it is properly applied and monitored for effectiveness. Recognizing this, the potential that selenium would be released from the EMSA to Permanente Creek resulting in exceedance of Basin Plan Water Quality Objectives values is still considered to be a potentially significant impact**;** however, compliance with **Mitigation Measures 4.10-1a, and 4.10-1b** ~~and~~ ~~**4.10-1c**~~, presented below, would reduce this impact to a less-than-significant level.

West Materials Storage Area

The WMSA contains overburden material generated from the mining of the Quarry pit. While most of the material consists of greenstone (meta-volcanic), greywacke, chert and low-grade limestone, drill logs have indicated that there are buried lenses of high-grade limestone material that have the potential to release selenium if exposed and left to react with stormwater runoff. The RPA proposes to harvest this material during reclamation of the WMSA under Phase 2 of the Project. Under baseline conditions, over half of the stormwater runoff from the WMSA flows to the Quarry pit through a series of roadside drainages, which utilize check dams to control flow. The remaining stormwater runoff either infiltrates into the overburden material or runs off the WMSA to be collected in drainage channels. Some smaller areas drain north of the site from the West Material Storage Area; flows from these areas do not enter Permanente Creek directly, but they are ultimately conveyed to the creek ~~further~~ farther downstream of the site where Wild Cat creek approaches Interstate 280. A roadside berm constructed on the outside edge of the access road and the inward slope of the road prevents stormwater from the WMSA from directly reaching Permanente Creek. However, there are areas along Permanente Creek (discussed in Impact 4.10-3) where pre- and post-SMARA mining related activities adjacent to the WMSA have resulted in debris flows and the discharge of boulders that allow stormwater to contact limestone and be discharged to the Permanente Creek. Water sample data are limited for the WMSA but a sample collected in July 2010 from a channel draining the WMSA had a selenium concentration of 29 μg/l. This sample was collected from a drainage channel that may have been underlain by selenium-containing limestone materials or the water had flowed through check dams constructed using the reactive limestone material. In other words, the sample may not be representative of the selenium concentration in stormwater flowing ~~from~~ only from overburden materials within the WMSA.

WMSA Reclamation

Ultimately, reclamation would remove the overburden material from the WMSA and the material would be placed in the Quarry pit as backfill. In most locations, the WMSA area would be graded down to reflect pre-mining contours that would expose the native bedrock (mostly greenstone). As discussed above, greenstone is not considered a source of selenium release to surface water. However, there are areas, such as smaller drainages, underlying the WMSA that have limestone material outcropping at the surface and these materials would be exposed following removal of the WMSA overburden. In areas where limestone is exposed at the surface, the RPA requires coverage with non-limestone-bearing overburden material (approximately one foot as is required at the EMSA) overlain by vegetation growth media. Removing the potential selenium source (high-grade limestone) by backfilling the Quarry pit and reclaiming the native exposures of limestone by coverage with non-limestone material would reduce the potential for elevated selenium concentrations in the stormwater runoff from the WMSA. However, as with the reclamation of the EMSA, the performance of the vegetative layers and non-limestone cover would be effective in reducing stormwater contact with limestone only if it is properly applied and monitored for effectiveness. Recognizing this, the potential that selenium would be released in stormwater from the former location of the WMSA to Permanente Creek is considered significant**;** however, **Mitigation Measures 4.10-1a** and **4.10-1b**, presented below, would reduce this impact to less than significant.

Quarry Pit

The effect of the Quarry dewatering on existing Permanente Creek water quality is indicated by the samples collected at station SW-2 and in comparison to background sampling results. A Quarry pit water sample in January 2010 had a dissolved selenium concentration of 82 µg/l (Golder, 2011), indicating that dewatering is a significant factor with respect to selenium concentrations in the creek. At SW-2, dissolved selenium concentrations ranged from 13 to 81 µg/l.

Quarry Pit Reclamation

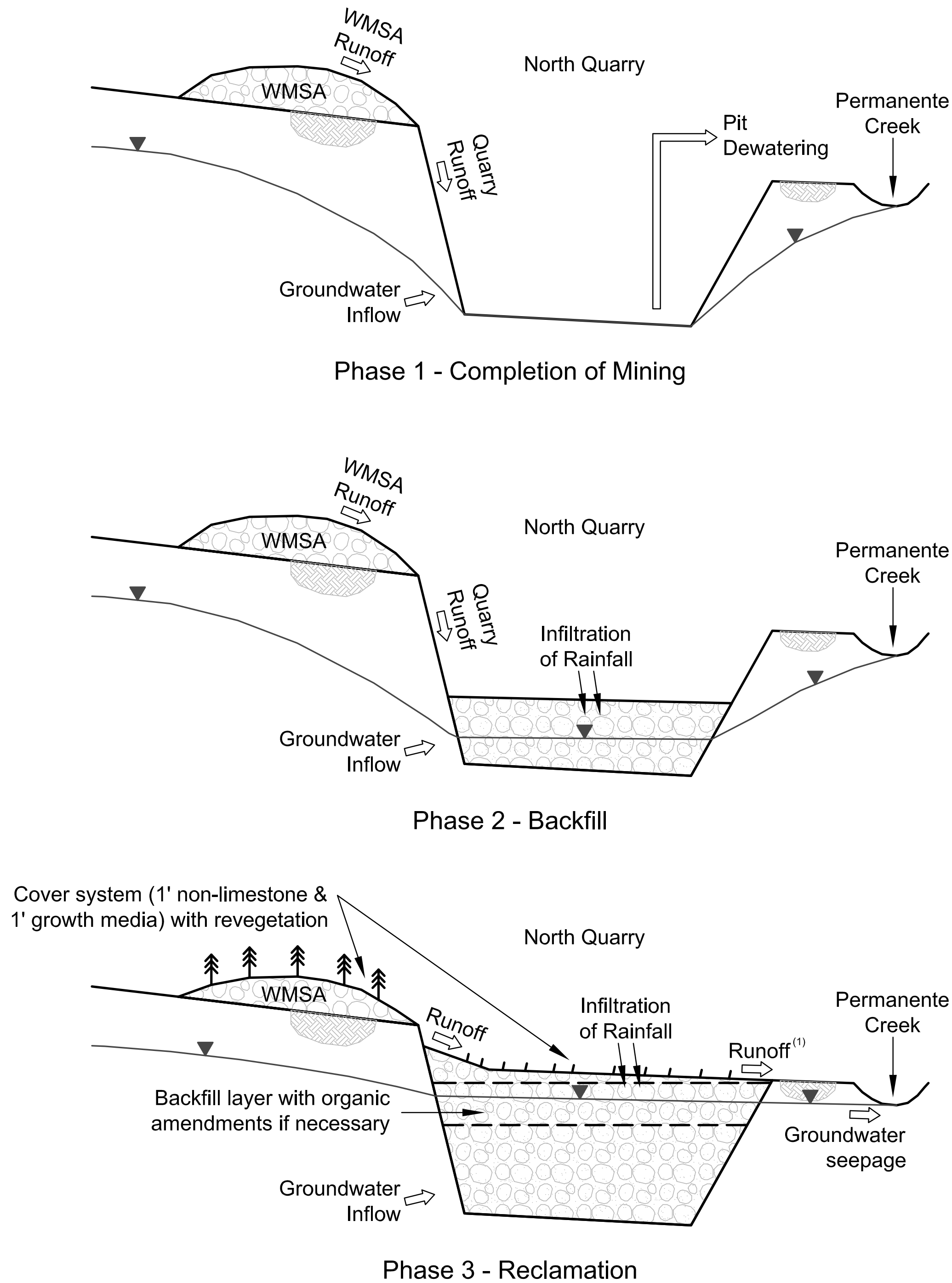
During a period of about five years after mining operations are completed in the Quarry pit, material from the WMSA would be placed as backfill into the pit to an elevation of approximately 990 amsl. Surface water runoff and infiltrating groundwater would fill the backfilled areas. The backfill plan has been designed to ensure that the surface of the backfill will remain at or above the maximum elevation of the groundwater, thereby avoiding surface impoundments (SES, 2011). The completed surface of the Quarry pit would be sloped to facilitate drainage to Permanente Creek (**Figure 4.10-3**). Steeper slopes exposing limestone on the north side of the Quarry pit would not be covered because cover material could not be maintained on the steep slopes. These areas were considered in water quality predictive modeling as areas that could potentially contribute selenium to runoff from the Quarry pit area.

During the remaining years of mining, surface water and groundwater entering the Quarry pit would be pumped out as it has been under baseline conditions. When mining ceases, water entering the Quarry pit from surface runoff or groundwater would not be pumped, but would be left in the pit to gradually fill the voids within the backfilled material. During the interim years of backfilling, some accumulated water may have to be pumped out to maintain dry working surfaces for backfill. For purposes of the water balance and quality evaluations completed for the analysis, it was assumed that quarry dewatering ceases after about six months of backfilling (SES, 2011).

Quarry Pit Water Quality

The water quality evaluation completed by SES for the Quarry pit used data collected from the site by Golder Associates and these data were used to assess water quality during existing and future mining and restoration phases as proposed in the RPA. Future water-quality conditions were estimated for the Quarry pit with a mass-balance water-quality spreadsheet model for each phase of the RPA spanning a 50-year period starting with Phase 1. SES (2011) performed water balance calculations for the Quarry pit for the periods of reclamation and post-reclamation conditions, typically for periods over 20 years. This time frame includes the period before Quarry pit backfilling begins and over 10 years after. Separate water balance and water quality models were established using Excel-based spreadsheets for both groundwater in the Quarry pit and for runoff from the backfilled Quarry surface. The conceptual model used for the Quarry pit backfill and runoff projections is shown in Figure 4.10-3.

The predictive water quality model assumes that the release of constituents from rock would be similar to that observed during the leachability testing described above, and there are no geochemical interactions of waterborne constituents with the adjacent rock materials (SES, 2011).



(1) Discharge of runoff occurs predominantly from areas of non-limestone materials

SOURCE: SES, 2011

Figure 4.10-3
Conceptual Model Water Balance
North Quarry Phases

For selenium, these are considered reasonable assumptions for projecting future conditions. The projections for the Quarry pit account for conditions resulting from excavation and the availability of selenium in rock surfaces. The key water mass balance components and the water quality described for each component are provided in **Table 4.10-6**. With respect to subsurface flow discharging from the pit after reclamation, the only Basin Plan Water Quality Objectives ~~Benchmarks~~ that were exceeded in the projections are TDS and selenium. The TDS Basin Plan Water Quality Objectives ~~Benchmark~~ is based on municipal use, which is not an existing beneficial use of Permanente Creek. Modeling projected that TDS in surface water after reclamation would be below the Basin Plan Water Quality Objectives ~~Benchmark~~ values (SES, 2011). Therefore, this analysis focuses on selenium concentrations in the surface and groundwater.

Sensitivity Analysis

Projections from predictive models can have varying outputs depending on the input data. For this reason, SES performed a sensitivity analysis with the water quality model to determine the influence of the various water quality input parameters and climatic changes. The sensitivity analyses were performed on selenium, which is considered the key constituent of concern. The sensitivity analysis included the following:

- Increasing input concentrations from each source of surface water and groundwater inflow individually by 15%, 25%, 50%, 75%, and 100%
- Using the maximum groundwater concentration as the final long-term groundwater inflow concentration (rather than the average used in the base case)
- Reducing the monthly rainfall by 30% for a period of 8 years to simulate the influence of an extended drought.

The sensitivity analysis indicated that runoff from the limestone walls would have the most profound influence on the water quality projections but the difference between the original input values and sensitivity assumptions were insignificant. Increasing the limestone quarry wall selenium concentration by 100 percent changed the range of output concentrations from 9 to 12 μg/l to 10 to 14 μg/l compared to the initial range of 10 to 15 μg/l (Table 4.10-7). Similarly, use of the maximum ground water concentration as the long term groundwater inflow concentration does not change the results (SES, 2011).

The sensitivity analysis indicates that lower monthly rainfall amounts increase the amount of time required for the pit to fill to its equilibrium level and increases the amount of time required to reach the long term concentration. Reducing the rainfall by 30 percent over 8 years lengthens the time required for the pit to fill with groundwater by one year but does not impact the final concentration of selenium.

Selenium has the greatest range of variation among the different sources of inflow, as shown in Table 4.10-6, and therefore, the sensitivity analyses for selenium are worst case among the parameters analyzed. The preparers of the EIR technically peer reviewed the sensitivity analysis and concurred with its methodology and conclusions.

**TABLE 4.10-6
QUARRY PIT WATER QUALITY PARAMETERS**

Water Balance Component	Rock Type	Water Quality									Rationale
		Antimony (µg/l)	Arsenic (µg/l)	Cadmium (µg/l)	Copper (µg/l)	Manganese (µg/l)	Nickel (µg/l)	Selenium (µg/l)	TDS (µg/l)	SO_4 (µg/l)	
Wall Runoff	Various	0.86	1.3	0.06	1.2	14	3.4	29	900	550	Dissolved wall runoff quality as characterized by WMSA runoff sampled in January 2010
Quarry Walls	Greenstone and greywacke	4.53	3.6	0.06	0.64	3.8	2.9	1.2	108	15	CAM WET test[c] (average for all tests)
Quarry Walls	Limestone	8.2	4.5	0.53	1.5	21	160	82	790	550	Quarry Pit Water
Infiltration through quarry backfill	Greenstone and greywacke	4.53	3.6	0.06	.64	3.8	2.9	1.2	108	15	CAM WET test (average for all tests)
Groundwater Inflow	Various, mainly limestone during Phase 1 before backfilling	8.2	4.5	0.53	1.5	21	160	82	790	550	Quarry Pit Water
	Gradual improvement during backfilling	Linear interpolation									N/A
	At the end of the backfill to the 990 level during Phase 3	0.23	2.34	0.06	1.66	21[a]	4.1	0.7	616	143	Average groundwater quality

a Manganese value based on Quarry pit water.
b Dissolved fraction is used because, under backfilling conditions, wall runoff will be filtered as it migrates through the backfill into the groundwater contained in the Quarry backfill.
c South Quarry results reflect data for the same geology and rock formations in the Quarry pit. The data were collected during mine exploration in areas south of Permanente Creek.

Source: SES, 2011

Projected Selenium Concentrations

Groundwater and Groundwater Discharge from the Quarry Pit. Infiltrating surface water and groundwater would fill the backfilled Quarry pit and eventually reach a level where it discharges into Permanente Creek. However, the groundwater level is not expected to reach a level of discharge for an estimated 14 years after backfilling begins; during that time, groundwater and infiltrated surface water would remain contained in the backfill. Within that 14-year period, it is reasonable to expect that groundwater chemistry would equilibrate and resemble existing groundwater water quality because of the long residence time of the water under submerged conditions in the pit.

When groundwater begins to flow out of the Quarry pit backfill and into Permanente Creek, the water quality modeling projects that selenium concentrations would range between 10 and 15 µg/l. That range exceeds the Basin Plan Water Quality Objective ~~Benchmark~~ of 5 µg/l as a 4-day average, but is below the 1-hour maximum of 20 µg/l and the MCL (50 µg/l) (**Table 4.10-7**). However, the overall level of selenium discharged in surface water runoff to Permanente Creek may be lower during certain times of the year due to blending with creek water.

TABLE 4.10.7
WATER QUALITY PROJECTIONS FOR SUBSURFACE FLOW OUT OF THE QUARRY PIT

Constituent	Quarry Pit Water (after reclamation)	Basin Plan Water Quality Objectives ~~Benchmarks~~ (Table 1)	Drinking Water MCLs[c] ~~Benchmarks~~ (for comparison)
Antimony	2 – 3	–	6
Arsenic	2.0 – 3.0	150 (4d), 340 (1h)	10
Cadmium	0.15 – 0.20	1.1 (4d), 3.9 (1h)	5
Copper	1.5 – 1.6	9 (4d), 13 (1h)	1,300
Manganese[a]	15 – 20	–	50
Nickel	30 – 40	52 (4d), 470 (1h)	100
Selenium	10 – 15[b]	5 (4d), 20 (1h)	50
TDS	600 – 650	450	500
Sulfate	120 – 140	–	250

[a] Concentration projections for manganese are higher than what will be observed because manganese will not behave conservatively as assumed in the projection models.
[b] Prescribed mitigation measures are anticipated to decrease this conservative projection by a factor of 3 (i.e., to a range of 3 to 5 µg/l).
[c] Maximum Contaminant Level

Source: SES, 2011

Based on the projected selenium concentrations determined by the predictive water quality model, the Applicant proposes to further reduce potential selenium levels in the Quarry pit water with in situ (in place) conditioning of the backfill with organic material. Decomposition of the organic matter enhances the necessary chemical reducing conditions needed to minimize the mobility of selenium in groundwater. As discussed in Section 4.10.1, *Setting*, dissolved selenium at the Quarry is in the oxidized form of selenate. If these oxidized forms are introduced to a sufficiently oxygen-reduced (also referred to as anaerobic) environment they will be transformed to selenide or elemental selenium. Elemental selenium is a solid, and selenide forms insoluble compounds with iron, calcium, and other common minerals. Selenide can also form harmless volatile compounds that de-gas to the atmosphere (SES, 2011). Case histories at other mines in the United States and Canada indicate that backfilling a mine pit and saturating the material causes chemically reducing (i.e., anoxic or anaerobic) conditions that result in very low mobility of selenium (e.g., BLM, USFS, and IDEQ, 2007; Park, 2008; SAPSM, 2010~~2020~~; ITRC, 2010~~2011~~; Kirk, 2011).

Case studies have shown that chemical-reducing or anaerobic conditions and lowered mobility of selenium can be promoted in backfilled mine pits; those conditions can be enhanced in the Quarry pit backfill by amending the upper 25 to 50 feet with organic matter. The organic matter would be combined with the backfill material during placement in the Quarry pit. Mulched green waste would likely be the preferred material due to its availability from local composting centers. The Applicant estimates that approximately 63,000 tons (about 170,000 cubic yards) of green waste would be required. The organic matter would be placed in the Quarry pit with the backfill material and heavy equipment would mix the mulch into the fill material. The addition of the organic material would take about three years.

Post-Reclamation Surface Water Runoff from the Quarry Pit. Once the Quarry pit is backfilled, surface water from much of the WMSA and Quarry pit area would infiltrate the backfill or run off surrounding surfaces and into Permanente Creek. During Phase 2, the concurrent reclamation of the WMSA would gradually incorporate reclamation stormwater best management practices (BMPs), which could reduce runoff into the Quarry pit area.

Projections of future water quality in the runoff from the reclaimed Quarry pit area are that waterborne selenium concentrations will be in the range of 2 to 4 μg/l, which is below the chronic Basin Plan Water Quality Objective ~~Benchmark~~ level for a 4-day average concentration. (**Table 4.10-8**). After reclamation, the quality of the Quarry pit water is expected to meet or come close to meeting the applicable Basin Plan Water Quality Objectives ~~Benchmarks~~ for selenium, and runoff water quality is expected to meet applicable Water Quality Objectives ~~Benchmarks~~. The Drinking Water Objectives ~~Benchmarks~~, although not applicable to Permanente Creek surface water, are included in the table to demonstrate that the water quality will not pose a risk to human health if it were to be used for consumption (SES, 2011).

It is reasonable to assume that, if properly implemented, the use of organic material as a supplement to produce an anaerobic condition in the backfill would reduce selenium concentrations in water that would discharge from the Quarry pit after reclamation. However, in recognition of the uncertainties with predictive models, especially those that project water quality concentrations 20 years in the future, and the potential for selenium concentrations in water discharged from the site to exceed Basin Plan Water Quality Objectives ~~Benchmark values~~ during or following reclamation, this impact is considered significant. **Mitigation Measure 4.1-1b** prescribed below would further reduce the long-term uncertainty of the predictive modeling by providing ongoing water quality monitoring and verification to ensure selenium concentrations remain below Basin Plan Water Quality Objectives ~~Benchmark values~~.

TABLE 4.10-8
PROJECTIONS OF FUTURE WATER QUALITY IN RUNOFF FROM RECLAIMED QUARRY AREA (µg/l)

Constituent	Runoff (after reclamation)	Basin Plan Water Quality Objectives ~~Benchmarks~~	Drinking Water MCLs[b] ~~Benchmarks~~ (for comparison)
Antimony	4 – 5	–	6
Arsenic	3 – 4	150 (4d), 340 (1h)	10
Cadmium	0.05 – 0.10	1.1 (4d), 3.9 (1h)	5
Copper	0.60 – 0.80	9 (4d), 13 (1h)	1,300
Manganese[a]	4 – 5	–	50
Nickel	2 – 3	52 (4d), 470 (1h)	100
Selenium	2 – 4	5 (4d), 20 (1h)	50
TDS	140 – 180	450	500
Sulfate	30 – 60	–	250

a Concentration projections for manganese are higher than what will be observed because manganese will not behave conservatively as assumed in the projection models.
b Maximum Contaminant Levels

Source: SES, 2011

Mitigation Measures Identified in this Report

This report identifies additional water management, monitoring, and verification mitigation measures beyond those proposed in the RPA to ensure that post-reclamation selenium concentrations remain below Basin Plan Water Quality Objectives ~~Benchmark levels~~. It is anticipated that water monitoring described would be conducted as part of any additional monitoring required by the RWQCB.

The following mitigation strategy is intended to reduce selenium concentrations in the surface runoff from the EMSA, the Quarry pit, and the WMSA. These measures involve 1) verification that non-limestone materials are used as the final reclamation cover, and 2) verification of selenium leachability and other important factors used in modeling, as well as water monitoring to ensure stormwater and non-stormwater discharges do not contain selenium concentrations exceeding Basin Plan Water Quality Objectives ~~Benchmark values~~.

Mitigation Measure 4.10-1a: Professional Geologist Verification of Non-Limestone-Containing Material Use. A California-certified Professional Geologist shall be onsite during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the Quarry pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The geologist shall inspect and document whether limestone is present at the source area (Quarry pit and WMSA), whether limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and Quarry pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of suspect rock fragments. If observation, field testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the geologist shall document its presence, temporarily halt fill operations, and notify the County Planning Office and field superintendent. Once notified, the Applicant shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification.

Mitigation Measure 4.10-1b: Verification and Water Quality Monitoring. The Applicant shall implement the following water monitoring and verification program within 90 days of Project approval and continue the program throughout the backfilling and reclamation phases and for ~~3~~ 5 years following completion of reclamation. As part of this program, the Applicant shall:

- Collect quarterly Quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium.
- Perform quarterly electrical conductivity and pH measurements of the Quarry water.
- Measure and record daily volumes of any water that is pumped from the pit area.
- Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall be estimated.
- Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered.
- Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and revegetation results in runoff water quality that meets Basin Plan Water Quality Objectives ~~benchmarks~~ and all other applicable water quality standards). Stormwater runoff monitoring and sampling shall be conducted following the placement and final grading of the 1-foot run-of-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding Basin Plan Water Quality Objectives ~~benchmark values~~. Three rounds of representative surface water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer.
- The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last five years of active mining. Based on the results of any refined water balance and water quality projections, the Applicant shall also review and refine the water management procedures.
- Reclamation of the Quarry Pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate, to the satisfaction of the Director of Planning and Development, that selenium in surface

water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Water Quality Objectives. ~~benchmarks.~~

Significance after Mitigation: As discussed in detail in the Regulatory Framework section, above, under the current requirements from the RWQCB, the Applicant must continue to maintain and pursue all appropriate permits and authorizations through the RWQCB including the NPDES Permit to reduce selenium. In addition, the Applicant must comply with requirements set forth by the RWQCB in the §13267 Order, the Sand & Gravel Permit authorizations, and in the upcoming issued individual NPDES Permit. The Applicant must sample as directed by the Sand & Gravel Permit authorizations and in the upcoming issued individual NPDES Permit. Finally, the Applicant must maintain procedures to ensure prompt identification and repair of damage to BMPs or structural control facilities, especially after large storm events.

In addition to these established regulatory requirements to protect surface water quality, implementation of Mitigation Measures 4.10-1a and 1b would: 1) ensure that the non-limestone material placed as cover over the EMSA and WMSA consists of documented non-limestone material, 2) verify the effectiveness of the stormwater quality controls throughout and after reclamation to ensure that proposed cover systems are adequately shielding limestone materials from surface exposure and preventing the discharge of selenium in concentrations exceeding applicable water quality standards, and 3) provide data to refine and re-evaluate water quality projections before reclamation is complete. The required regulatory measures and the prescribed mitigation measures would reduce the uncertainty in the water quality projections and provide a metric to manage stormwater quality and reduce potential discharges of selenium to Permanente Creek. These mitigation measures would reduce the impact to less than significant.

Impact 4.10-2: Interim reclamation activities within the Project Area would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek. ***(Significant and Unavoidable Impact)***

After approval of the RPA, reclamation would begin at the EMSA and would continue for some portions of the site for an estimated 20 years until the final reclamation is complete at the WMSA and Quarry pit. Reclamation activities would be most pronounced in the EMSA, WMSA, and Quarry pit but would also occur to a lesser degree at the Crusher/Quarry Office Area, Surge Pile, and Rock Plant. In addition, reclamation activities at the Permanente Creek Reclamation Area (PCRA) would be implemented during Phase 1 and Phase 2 of reclamation. During the estimated 20 years of reclamation activities, the RPA area has the potential to deliver selenium-bearing stormwater and sediment to Permanente Creek. Reclamation phasing and proposed activity in each of the RPA areas are discussed below.

EMSA

The primary reclamation activity at the EMSA would consist of grading and recontouring. Placing the final cover with non-limestone run-of-mine materials would require stockpiling and hauling. During the interim period while reclamation is under way, limestone-bearing rock, fine grained, wash material deposited from the rock plant, and other fine to coarse-grained material within the EMSA would be disturbed and exposed to stormwater and wind erosion.

Quarry Pit

Reclamation by backfilling would commence in Phase 2. The Quarry pit would continue to act as a catch basin for the surface water flowing off the WMSA and surrounding areas. Considering that reclamation of the Quarry pit primarily involves backfilling a closed basin, the potential for selenium-bearing stormwater and sediment to be released to the Permanente Creek is less than that for the other areas. However, selenium-bearing water would likely be released when the pit requires occasional dewatering during backfilling operations.

WMSA

The WMSA would continue to receive waste material from the Quarry pit and elsewhere on the Quarry property until reclamation of the WMSA begins in Phase 2. During the interim period before reclamation begins at the WMSA, which could be at least 10 years, the WMSA would essentially remain as it is under baseline conditions. Under these conditions, stormwater runoff is collected in drainages that are conveyed to the Quarry pit. In certain areas, especially on the north end of the WMSA, stormwater runs off the WMSA and is ultimately conveyed to the creek ~~further~~ farther downstream of the site where Wild Cat Creek approaches I-280. After reclamation commences at the WMSA, material would be used to backfill the Quarry pit.

Crusher/Quarry Office Area

Stormwater and sediment discharges from the Crusher/Quarry Office area would continue to occur as it has under baseline conditions until Phase 3 when the area undergoes reclamation. During reclamation, finish grading would disturb soil, resulting in temporary stockpiles requiring Best Management Practices (BMPs) to mange runoff and control erosion. Stormwater runoff and erosion control measures would be required until ~~a~~ growth medium erosion control measures are installed and reseeding and planting activities are complete.

Surge Pile

Reclamation of this area would occur in Phase 3 and would require the excavation and removal of the Surge Pile. Excavation and final grading in this area could result in exposed disturbed areas that have the potential to discharge sediment offsite to Permanente Creek. Temporary BMPs, as presented in the RPA, would be installed during those activities to control sediment transport, including silt fences~~,~~ and hydroseeding.

Rock Plant

Reclamation of the Rock Plant in Phase 3 would require finish grading, application of growth medium, installation of erosion control measures, and reseeding and planting activities. Limited ground disturbance is anticipated in this area and temporary BMPs would be implemented as necessary.

Impact Discussion

The RPA would span a period of about 20 years and during that time, many areas within the RPA would undergo active ground disturbance by excavation, grading, stockpiling, hauling and conveyor operation. Areas not undergoing active reclamation work would be temporarily idle (i.e., stockpiles, temporary working slopes, unused conveyors). Through the duration of reclamation, both active and inactive areas have the potential to produce runoff, be subject to erosion, and discharge sediment to Permanente Creek and, as in the case of the WMSA, to Wild Cat Creek from the tributary at the north end of the WMSA. Depending on the location, some of the stormwater runoff generated from these areas could contain selenium. While the RPA indicates that temporary sediment control BMPs would be implemented as needed in accordance with the drainage plan and current SWPPP, the need for more rigorous control would be necessary. Therefore, because interim reclamation conditions could introduce sediment, waterborne selenium, and TDS into the drainage channels, desiltation basins, and potentially, Permanente Creek, this impact is considered significant.

Mitigation of this impact requires aggressive use of interim BMPs to protect areas that are disturbed, temporarily inactive, and partially reclaimed from stormwater runoff and erosion. The performance of these measures would be evaluated by regular surface water quality monitoring. If surface water monitoring indicates that there is selenium at concentrations above Basin Plan Water Quality Objectives, elevated TDS, or excessive sediment in the runoff, the source of these pollutants would be evaluated and appropriate BMPs could be implemented. During reclamation, stormwater from the Quarry pit area and a portion of the stormwater runoff from the WMSA would flow into the Quarry pit, where it would be collected and eventually discharged to Permanente Creek. Stormwater containing selenium in the EMSA could also discharge to Permanente Creek. Therefore, the following mitigation measures are proposed. For the purposes of the mitigation measures which follow, a "qualifying rain event" is defined as 0.5 inches or more precipitation with a 48-hour or greater period between rain events. This definition is based on the new California Construction General Permit (CGP) [Order NO. 2009-0009-DWQ] intended to reduce the discharge of sediment and polluted runoff from disturbed areas on active construction sites.

> **Mitigation Measure 4.10-2a: Interim Stormwater Control and Sediment Management.** To minimize the discharge of sedimentation and metal constituents, particularly selenium, to watercourses, the Applicant shall implement the following stormwater and sediment management controls in addition to general BMPs required by the SWPPP in active and inactive reclamation areas throughout the duration Phases 1, 2, and 3 of the Project. The Applicant shall:
>
> - Segregate limestone materials from the non-limestone materials (breccia, greaywacke, chert, and greenstone) by way of operational phasing to ensure that non-limestone materials are placed beneath and are covered by non-limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.
>
> - Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of

BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.

- Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.
- In areas such as the WMSA where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the PCRA and Permanente Creek ~~Area~~. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, operator training regarding the prevention of triggering debris slides.
- Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.
- Divert all runoff generated from disturbed active and inactive reclamation areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways entering Permanent Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.
- Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.
- Replace the limestone rock and materials that are currently used in the existing BMP ditches and cover or otherwise separate runoff from limestone rock in the existing sediment pond embankments.
- Cover large limestone surfaces that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.
- Inspect~~ed~~ and maintain BMPs after each qualifying ~~storm~~ rain event ~~(minimum of one-quarter inch of rainfall as measured by onsite device)~~ to ensure their integrity.
- Reconstruct or reline all existing stormwater conveyances and check dam structures that are constructed or lined with limestone rock using non-limestone material (greenstone, breccias, greywacke, metabasalt), available at the Quarry.
- Regularly inspect all stormwater and erosion controls, especially before and following ~~significant run-off-producing~~ qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be reported and corrected immediately.

- Provide adequate erosion control training to all equipment operators, site superintendants, and managers to ensure that stormwater and erosion controls are maintained and remain effective.
- Use only jute netting or other suitable replacement for erosion control in the PCRA; no plastic monofilament shall be used for erosion control or other purposes, as California Red Legged Frogs and other wildlife may become entangled in it.
- Ensure that all stormwater, erosion, and sediment control BMPs ~~are approved by the California Stormwater Quality Association (CASQA) and~~ are installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist, or landscape architect, an American Institute of Hydrology registered professional hydrologist, or a certified erosion control specialist.

Mitigation Measure 4.10-2b: EMSA Interim Stormwater Monitoring Plan. The Applicant shall develop a stormwater sampling plan that would supplement preexisting surface water monitoring required by General Industrial Storm Water and Sand and Gravel NPDES Permit and be designed specifically to monitor surface water during reclamation activities in active and inactive excavation and backfill areas. The purpose of this plan is to evaluate performance of temporary BMPs and completed reclamation phases at the EMSA and to identify areas that are sources of selenium (measured on total recoverable basis), sediment, or high TDS. At a minimum, the plan shall require the Applicant to inspect BMPs and collect water samples for analysis of TDS and metals, including selenium, within 24 hours after a ~~storm~~ qualifying rain event and sample non-stormwater discharges when they occur. If elevated selenium, sediment, or TDS is identified through sample analysis, the Applicant shall identify the source and apply any new or modified ~~CASQA-approved~~ standard BMPs available. BMPs that show sign of failure or inadequate performance shall be repaired or replaced with a more suitable alternative. Following implementation, the Applicant shall re-test surface water to determine the effectiveness of such modifications, and determine whether additional BMPs are necessary.

During reclamation (Phases 1, 2, and 3 of the Project), stormwater from the Quarry pit area and a portion of the stormwater runoff from the WMSA would flow into the Quarry pit, where it would be collected and eventually discharged to Permanente Creek. Stormwater containing selenium in the EMSA could also discharge to Permanente Creek. Mitigation measures to address temporary water quality impacts during interim reclamation activities are described below.

The purpose of these mitigation measures is to require implementation, testing, and reporting of the BMPs, while concurrently completing the investigation, pre-engineering, and pilot testing for a treatment facility or alternative treatment method deemed acceptable by the RWQCB. If the BMPs prove ineffective for two consecutive years because selenium discharge into Permanente Creek from the EMSA exceeds the Basin Plan Water Quality Objective for selenium, or the selenium discharge into Permanente Creek from the WMSA and Quarry Pit exceeds the baseline level established prior to Phase 2 of the Reclamation Plan, then the Applicant shall construct and operate a treatment facility or alternative method (such as alternative water management) deemed acceptable by the RWQCB.

Mitigation Measures 4.10-2c and 4.10-2e shall apply to the EMSA area during Phase 1 of the Reclamation Plan, and Mitigation Measures 4.10-2d and 4.10-2e shall apply to the WMSA and the Quarry pit during Phase 2 and 3 of the Reclamation Plan, as described below:

Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA.

- Within 30 days of Reclamation Plan Amendment approval, sampling and testing shall occur within 24 hours after a qualifying rain event. If no qualifying rain event occurs within 30 days of Reclamation Plan approval, then testing shall begin at the first qualifying event. Testing shall be conducted in accordance with the Stormwater Sampling Plan developed and approved in accordance with Mitigation Measure 4.10-2b.

- If test results for two consecutive years show that stormwater discharging from the EMSA into Permanente Creek exceeds total recoverable selenium of 5 µg/L, or other applicable discharge requirement as determined by the RWQCB, then the County shall schedule a public hearing before the Planning Commission to determine whether the Applicant is complying with the stormwater discharge requirements. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

- If the Planning Commission determines that the Applicant is not complying with discharge requirements, then the Applicant shall install a treatment system (or alternative) as described under Mitigation Measure 4.10-2e.

Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit.

- Within 30 days of the start of reclamation activities for Phase 2, the Applicant shall conduct monthly water sampling and testing results as described in Mitigation Measure 4.10-1b.

- If test results for two consecutive years show that selenium levels are higher than base levels, then the County shall schedule a public hearing before the Planning Commission to determine whether the reclamation activities are causing an increase in total selenium above the base levels. “Base levels” shall be defined as water testing results for an average for two years immediately prior to start of Phase 2 reclamation for discharge into Permanente Creek from the WMSA and Quarry pit. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

- If the Planning Commission finds that reclamation activities are causing an increase in selenium over base levels, then the Applicant shall install a treatment system (or alternative) as described under Mitigation Measure 4.10-2e.

Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit.

- Within 30 days of Reclamation Plan Amendment approval, the Applicant shall begin designing a treatment facility (or alternative) and pilot system for discharge into Permanente Creek. The treatment shall be designed to achieve the Basin Plan Water

Quality Objective for selenium (total recoverable selenium of 5 μg/L) for discharge from the EMSA, and/or to achieve the "base level" standard for the WMSA and Quarry pit as defined under Mitigation Measure 4.10-2d.

- The Applicant shall complete design, pilot testing, and feasibility analysis for a treatment facility within 24 months of Reclamation Plan Amendment approval or by such other time as may be prescribed by the RWQCB.
- The Planning Commission shall hold a public hearing no later than 30 months after Reclamation Plan Amendment approval to determine feasibility of the treatment facility (or alternative). The Planning Commission may defer the public hearing if the Regional Water Quality Control Board determines that additional time is necessary to complete the design, pilot testing, and feasibility analysis,
- If the Planning Commission determines that a treatment facility is feasible, the Planning Commission shall also establish a timeline for implementing the treatment facility.
- Construction, installation, and operation of a treatment facility (or alternative) shall be required if discharge requirements are not met as described under Mitigation Measures 4.10-2c and 4.10-2d, based on a determination of the Planning Commission, and if it has been determined feasible by the Planning Commission following a public hearing.

Significance after Mitigation: Implementation of Mitigation Measure 4.10-2a would establish additional BMPs to ensure that over the 20-year duration of the Project, a rigorous stormwater and sediment control implementation plan is developed to reduce the potential for stormwater runoff to deliver sediment and selenium to Permanente Creek. Mitigation Measure 4.10-2b develops a specific stormwater monitoring plan that would monitor the effectiveness of the interim BMPs and completed phases of reclamation and requires the Applicant to repair sources of selenium runoff, excessive sediment, and TDS. ~~Although~~ Implementation of this mitigation is expected to reduce ~~selenium-containing runoff,~~ sediment~~,~~ and TDS to acceptable levels such that interim impacts from sediment and TDS would be less than significant. However, there is insufficient evidence at this time regarding the efficacy of these measures with regard to selenium-containing runoff. Therefore, additional mitigation was evaluated to determine whether any available water treatment technologies could address this issue.

A detailed feasibility study conducted by CH2M Hill concluded that a water treatment facility to remove selenium from the Quarry discharge may be technically feasible (CH2M Hill, 2012b). The feasibility study examined a number of methodologies that have provided the most consistent treatment of selenium down to 5 μg/L levels in other industrial and mining applications, including attached growth biological (e.g., fluidized bed reactor [FBR], Advanced Biological Metals Removal [ABMet], course coal reject bioreactor [CCR], and immobilized cell bioreactor [ICB]), evaporation/crystallization, ion exchange, passive (e.g., biochemical reactor and constructed wetlands), and zero valent iron (ZVI) technologies.

The feasibility assessment selected a conceptual system design based on FBR technology as the most effective system for selenium removal at the Quarry. For such a system to be effective for selenium removal down to 5 µg/L or below, however, a comprehensive water management program would be required, accommodating for water flows both from the EMSA area and the Quarry Pit. Further, a FBR system would be expensive, with a total installed capital cost estimated to range from $31.8 million to $127 million (CH2M Hill, 2012b) and an annual maintenance and operations cost of over $6 million. This estimate does not include costs for technology confirmation or pilot testing.

While Mitigation Measure 4.10-2e requires the design and testing of a pilot-scale treatment facility to remove selenium, considerable uncertainty remains regarding the feasibility of installing a full-scale treatment system that would be adequately effective in achieving a discharge concentration at or below 5 µg/L for selenium. Even if proven feasible, the construction of such a facility could take at least three years to complete (CH2M Hill, 2012b). Consequently, during interim reclamation activities, it remains possible that selenium concentrations in surface water runoff into Permanente Creek from the EMSA would exceed the Basin Plan Objective of 5 µg/L, or that discharge into Permanente Creek from the WMSA and Quarry Pit could exceed the baseline level. There are commercially available treatment technologies that have been demonstrated to remove selenium and that can effectively and consistently reduce selenium levels to below 5 µg/l (4-day basin Plan Benchmark). These technologies include ferrihydrite adsorption (iron co-precipitation), ferrous hydroxide, ion exchange, or fluidized cell reactors. However, these systems can be very costly. A cost estimate for a water treatment system sized to handle the flows from the WMSA, Quarry pit, and EMSA was developed. The system was estimated to have a total installed cost of approximately $86 million, and to cost approximately $2.8 million per year to operate and maintain (Sandy, 2011).[14] Due to the high estimated costs, this potential mitigation was determined to be infeasible. As a result of these factors, the County has determined the impact to water quality in Permanente Creek from selenium runoff would be significant and unavoidable during the interim period until final reclamation is completed.

Impact 4.10-3: The Permanente Creek Reclamation Area (PCRA) reclamation activities would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek. ***(Less than Significant Impact)***

Sediment yield downstream from in the southern headwater area of Permanente Creek has been estimated to be chronically about 3.5 times higher than it would be under natural basin conditions (Nolan and Hill, 1989), potentially contributing to flooding and other adverse effects downstream, and potentially compromising downstream beneficial uses as established in the Basin Plan. Currently, pre- and post-SMARA slopes within the PCRA are eroding into

[14] This treatment system assumes treatment of the selenium primarily in the form of selenate as well as treatment to meet conventional pH, D.O., BOD, and TSS discharge limitations. These are Class 5 cost estimates (+100%, -50%) as defined by the Association of the Advancement of Cost Estimating International, and include a 25 percent contingency. The cost estimates also assume that stormwater detention facilities would be constructed to divert and equalize the runoff into a storage impoundment, thereby resulting in an equalized flow of 8 cfs or 3,590 gpm and limiting the size of the treatment system.

Permanente Creek. In addition, the pre- and post-SMARA slopes and mining disturbances with the seven ~~areas of~~ PCRA areas may be delivering selenium and high TDS to Permanente Creek.

The remedies and treatments in the RPA include improving slope conditions, stabilizing slopes, reconditioning and installing drainage basins, and installing BMPs to control sedimentation and run-off. The actions proposed for the PCRA would stabilize slopes adjacent to the creek, remove active sources of selenium (i.e., removal of limestone boulders) and TDS, revegetate eroded soil areas, remove in-stream improvements, and regrade and restore the creek within several reaches. The proposed instream restoration work that would be required would be conducted during periods of low stream flow to avoid adverse impact to water quality. The instream work, such as removing boulders, would be temporary and would not permanently alter the flow of the creek. Best Management Practices, such as silt fencing, temporary coffer dams, ground covers for erosion protection, and immediate replacement of scarified areas would be used to reduce disturbance of creek sediments thus reducing the possibility for water quality degradation. Because these actions would be an overall improvement to the hydrologic regime along Permanente Creek and would result in less erosion and greater long-term slope stability, this impact is considered less than significant.

Impact 4.10-4: The Project would alter the existing drainage pattern of the site, which could cause ~~result~~ increased stormwater runoff rates and on- or offsite flooding. ***(Less than Significant ~~and Unavoidable~~ Impact with Mitigation Incorporated)***

The County of Santa Clara requires that new storm drain systems and channels be designed to convey the design 10-year flow without surcharge and that a safe release be provided for the design 100-year flow. SMARA requires that erosion control methods be designed for the 20-year storm. The County Drainage Manual provides parameters for the 25-year event but not for the 20-year event. The 25-year event was analyzed in the Applicant's Drainage Report (Chang Consultants, 2011) to satisfy the requirement for the 10-year and 20-year events. The results of the hydrologic analyses in the Drainage Report are consistent with the Santa Clara County Drainage Manual, the SCVURPPP C.3 Stormwater Handbook (SCVURPPP, 2004), and SMARA.

Permanente Creek is known to have flooding problems downstream of the Quarry. Adjacent to Permanente Road along the existing Aluminum Plant, Permanente Creek is mapped as a Zone AE Special Flood Hazard Area (SFHA) with base flood elevations (BFEs) defined in a detailed flood insurance study. This area is shown on Figure 4.10-1. The effective Flood Insurance Study for Santa Clara County dated May 18, 2009 identifies the drainage area "downstream of Permanente Road" (the upstream end of the FIRM study) as 3.40 square miles and the 100-year flow at this location as 1,480 cubic feet per second (cfs).

Chang Consultants, in a letter dated December 16, 2011 discussed further review of the FEMA flood values and handling of the Quarry area in the FEMA Flood Study. Additional analyses presented with this report support the position that the increased flows to Permanente Creek resulting from the Project would not increase 100-year flows above the FEMA flows, and that the

FEMA Study did not include the storage effects of the Quarry pit. The Santa Clara Valley Water District (SCVWD) is currently working on flood control improvements for Permanente Creek downstream of the Project. The 100-year design flow being used by SCVWD for Permanente Creek includes detention in the Quarry pit as the existing condition (SCVWD, 2011).

Under existing conditions, the Quarry pit captures drainage from 361.5 acres, which includes the Quarry pit and about 60 percent of the WMSA. Pit water is pumped to Permanente Creek at an approved maximum discharge of 4.5 cfs per the NPDES permit. This condition is proposed to continue during Phase 1 of the RPA, and then discontinue during Phase 2, when the Quarry pit is backfilled, and during Phase 3, when final reclamation is completed. The Quarry pit will continue to capture drainage until it is backfilled, and thus the effect to downstream flooding during Phase 2 is similar to the baseline condition. After the Quarry is backfilled, the Quarry floor is proposed to drain to Permanente Creek. A desiltation basin is proposed to be installed to detain runoff from the Quarry floor prior to conveying it to the creek. The proposed desiltation basin would be sized to meet County and SMARA standards but it is not proposed to function as a detention basin and mitigate stormflow increases to Permanente Creek. The 100-year discharge to the Quarry floor was calculated in the Drainage Report at 235 cfs for the proposed reclaimed condition in Phase 3. Without detention, this peak flow would discharge to Permanente Creek and constitute a 230.5 cfs increase from the approved maximum discharge of 4.5 cfs under existing conditions This magnitude of increased run-off from the site would result in potential downstream flooding, hydromodification effects along Permanente Creek, and potential adverse flow effects at the Permanente Diversion structure. Considering the potential impacts on downstream, offsite drainage, under the current RPA, this impact is considered significant.

The severity of this impact would be reduced and the impact could be avoided by implementing the following mitigation measure~~, if it is deemed feasible~~.

> **Mitigation Measure 4.10-4: Construction of Onsite Detention Facility.** The Applicant shall design and construct detention facilities that would 1) manage increased runoff caused by the reclaimed Quarry pit, 2) reduce excessive discharges to Permanente Creek, and 3) develop the capacity to detain and release the 100-year flow using onsite detention ~~ponds~~ <u>basins</u> while optimizing groundwater infiltration. The final drainage design shall ensure that offsite, downstream flows would not cause an increased flooding potential or lead to hydromodification effects. <u>Design considerations for onsite detention basins shall include the following performance standards. The basin shall be designed to:</u>
>
> - <u>Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB.</u>
> - <u>Effectively drain between storm events within the period of time specified by the Santa Clara County 2007 Drainage Manual.</u>
> - <u>Enhance the settlement of fine sediment while limiting the potential for sediment-laden water to be discharged to Permanente Creek.</u>

- Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods.

- Control surface water inflows to the detention facility using energy reduction features (i.e., rip-rap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin.

- Infiltrate surface water to the extent practicable while accounting for and protecting the local groundwater condition and water quality.

In addition to the detention facilities for the Quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control improvement project.

Significance after Mitigation: Implementation of Mitigation Measure 4.10-4 would provide the necessary facilities to reduce offsite stormwater discharge to Permanente Creek during the 100-year storm event~~. However, as of the time that this EIR was published, it is unknown if a basin or other detention measure of sufficient size could be feasibly constructed onsite to reduce this impact~~ to less than significant levels. ~~If this is not determined to be feasible, the impact would remain significant and unavoidable.~~

Impact 4.10-5: Groundwater discharge from the Quarry pit after backfilling and reclamation is complete would adversely alter surface water flows to Permanente Creek. *(Less than Significant Impact)*

The Quarry pit currently captures groundwater that would potentially discharge to Permanente Creek. After entering the Quarry pit, the water is pumped ~~back~~ to the creek via a detention basin up to a maximum capacity of 1,150 gallons per minute (gpm) or 2.56 cubic feet per second (cfs); 4.5 cfs is the maximum discharge allowed and the pumping capacity. This flow occurs throughout the year and increases dry-season baseflow in Permanente Creek downstream. Upstream of the discharge, the stream currently dries up adjacent to the Quarry pit during the dry season. Farther ~~Further~~ upstream, beyond the influence of the Quarry pit, it reportedly flows year-round.

Permanente Creek is at an elevation of 1,000 to 1,100 feet above mean sea level (amsl) adjacent to the Quarry pit. Analysis by the Applicant's engineer, Golder Associates, predicts that additional groundwater capture would occur as the Quarry pit is deepened from its current elevation of 750 to 440 feet amsl, during Phase 1 of the revised RPA. Deepening the Quarry to 440 feet amsl would increase the groundwater inflow into the Quarry pit by a predicted 60 gallons per minute (gpm). The operation and reclamation of the Quarry pit is not predicted to have a measurable effect on groundwater discharge to Monte Bello Creek and to the upper reaches of Permanente Creek.

However, it is estimated that a decrease in groundwater discharge to the middle reach of Permanente Creek (i.e., adjacent to the Quarry) of 0.1 cfs (40 gpm) would occur as Quarry pit excavation approaches the 440 foot amsl elevation. When this occurs, the creek reach adjacent to the quarry areas would continue to dry back; this dry back would potentially expand longitudinally and for a longer time during the dry season (Balance Hydrologic, 2011). Once the Quarry pit is reclaimed and fully backfilled, then the middle reach of Permanente Creek would receive about 0.5 cfs (206 gpm) more groundwater discharge than under current conditions. Golder's analysis predicts that groundwater capture would decrease and ultimately cease as the Quarry pit is backfilled during Phase 2 and 3 of the revised RPA. As the Quarry areas are reclaimed and as pit-water discharge to Permanente Creek diminishes, the dry-season baseflow to the creek from Quarry pit dewatering would logically recede naturally to considerably lower levels than currently maintained. Considering that groundwater would be discharged to Permanente Creek from the reclaimed Quarry pit, it is a reasonable assumption that perennial or near-perennial flow would resume in the reach adjacent to the Quarry that currently runs dry. Given that Permanente Creek flows are not predicted to increase more than 1 cfs (remaining under the 4.5 cfs allowable limit), and considering that perennial or near-perennial stream flow may resume after the Quarry pit reclamation is complete, this impact is considered less than significant.

Impact 4.10-6: The Project would alter the existing drainage pattern of the site, which could result in increased stormwater ponding, accumulation of selenium, and flooding. ***(Less than Significant Impact with Mitigation Incorporated)***

The water level in the Quarry pit after mining and backfilling is projected to reach a maximum elevation equal to the surface of the backfill at 990 ft amsl. This elevation represents the low-point surface water overflow to Permanente Creek. Once the groundwater reaches equilibrium, the estimated total average annual inflow of groundwater, surface water, and precipitation into the backfilled and reclaimed Quarry pit is 169 gpm (Golder, 2011). This quantity of water is expected to discharge to Permanente Creek as groundwater depending on how effectively water flows through the materials separating the Quarry backfill from the creek. However, during periods of intense rainfall or high rainfall years, the groundwater level beneath the surface of the reclaimed Quarry pit may rise above the 990-foot amsl level resulting in reduced infiltration or flooding and excess stormwater runoff. Considering that some of the runoff would originated from exposed limestone slopes on the north side of the Quarry, there is a potential for the localized accumulation of selenium-containing runoff. Ponded runoff containing selenium could cause high selenium levels to accumulate in the vegetative cover layers or be discharged as surface runoff to Permanente Creek. This is considered a significant impact. Implementation of water management strategies could reduce this impact to less than significant.

> **Mitigation Measure 4.10-6: Stormwater Control to Avoid Ponded Water and Selenium Accumulation.** The Applicant shall incorporate drainage features into the final drainage design for the Quarry pit area to eliminate the potential for surface ponding on the floor of the Quarry pit once it has reached its final elevation (990 amsl). The drainage design for the finished Quarry pit fill shall include engineered elements (e.g. conveyance channels,

infiltration galleries) that facilitate groundwater recharge and percolation from limestone areas to groundwater in the Quarry backfill with the objective of accommodating high groundwater elevation without creating surface water bodies that may contain elevated levels of selenium. These measures shall be incorporated into the design of the ~~proposed~~ additional basin proposed for the floor of the Quarry pit once the floor is raised to its final elevation.

Significance after Mitigation: Implementation of Mitigation Measure 4.10-6 would ensure that the final designs of the final Quarry pit reclamation provides surface water controls to reduce the potential for surface ponding during large storm events thereby reducing the potential for areas of selenium accumulation in soils and vegetation. With implementation of this mitigation measure, this impact would be less than significant.

4.10.6 Alternatives

4.10.6.1 Alternative 1: Complete Backfill Alternative

Impacts to hydrology would be similar to those described under the Project analysis except that under Alternative 1, the EMSA would remain intact and not undergo reclamation until 2023, thereby extending the amount of time that limestone remains exposed and selenium is discharged to the surface water. However, by removing the EMSA altogether by 2027, there is no potential that the EMSA would leach selenium to the environment over the long term. Impacts related to interim sedimentation and potential runoff are similar to the Project but may be slightly worse because, rather than reclaiming the EMSA in place, the material would have to transported to the Quarry pit for backfilling. Excavation, hauling, and conveyors increase the potential for sedimentation, erosion, and the release of selenium, sediment and metals to surface water. Impacts associated with the WMSA would be similar to the impacts considered under the Project except that under Alternative 1, the WMSA would remain unreclaimed for a longer period of time thereby increasing the risk for selenium to be discharged to Permanente Creek. Alternative 1 would have similar impacts with regards to post-reclamation drainage. Without adequate detention, the increase in surface flows from the RPA would increase downstream flows exceeding the design of the current SCVWD flood control project located downstream and mitigation would be needed. Under Alternative 1 and similar to the Project, this impact would be significant and unavoidable unless it was determined that the Applicant could construct an appropriately sized detention basin to detain 100-year flood flows. Given that the Quarry pit would be filled under this alternative, groundwater impacts would be similar to those identified by the Project. Alternative 1 would cover exposed limestone slopes within the pit thereby reducing selenium concentrations in surface water ultimately discharging to Permanente Creek.

Alternative 1 would have similar impacts as the Project and would likely utilize similar mitigation measures to control runoff, reduce selenium concentrations, manage drainage and reduce groundwater impacts. While Alternative 1 could reduce the potential for long-term selenium leaching to surface water due to coverage of exposed slopes, the drainage issues due to the larger area and higher slopes in addition to the longer interim periods that the WMSA and EMSA remain in an unreclaimed state could result in more severe impacts to water quality.

4.10.6.2 Alternative 2: Central Materials Storage Area Alternative

Impacts from Alternative 2 would be similar to those described under the Project. Alternative 2 would result in the reclamation of the EMSA sooner than under the proposed Project, thereby reducing the potential for selenium discharges to Permanente Creek from the EMSA. However, overburden placement on the CMSA would commence when the EMSA is no longer used and would continue through the cessation of mining. Grading and overburden placement activities associated with the CMSA could result in similar potential water quality impacts as would be realized with the Project. The CMSA would be reclaimed similar to the EMSA (i.e., 1-foot of run-of-mine non-limestone material with an overlying growth medium) and would be monitored for selenium, TDS and other potentially waterborne pollutants. Given the similar reclamation approach, Alternative 2 would not cause more severe impacts nor would it reduce impacts from the proposed Project.

4.10.6.3 No Project Alternative

The No Project Alternative would extend the period of time that reclamation would begin on the EMSA and WMSA, thereby increasing the potential for selenium to leach out of the stockpiled materials and enter the Permanente Creek in stormwater runoff. Discontinued use of the EMSA would lessen the water quality impacts associated with selenium because no new selenium-containing material would be added; however, water quality impacts associated with selenium leaching from existing overburden material at that location could continue without immediate reclamation. Drainage impacts (i.e. increased offsite drainage and flooding) related to Quarry infilling would be similar to those under the Project although offsite, downstream effects due to increased runoff from the site would occur several years later. Therefore, because conditions would likely exist for a greater period of time under the No Project Alternative, impacts related to drainage and water quality would, overall, be greater than those under the proposed Project.

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