

AMADOR COUNTY, CALIFORNIA IONE QUARRY EXPANSION PROJECT

VOLUME II: DRAFT ENVIRONMENTAL IMPACT REPORT APPENDICES (A—I)

State Clearinghouse No. 2021090273

AUGUST | 2024

Lead Agency

Amador County Planning Department

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State Clearinghouse No. 2021090273

AUGUST | 2024

Lead Agency

Amador County Planning Department
810 Court Street Jackson, CA 95642

Prepared By:

Benchmark Resources
2515 East Bidwell Street, Folsom, CA 95630

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APPENDIX A
NOC/NOP AND INITIAL STUDY

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APPENDIX A-1
NOTICE OF PREPARATION

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AMADOR COUNTY COMMUNITY DEVELOPMENT AGENCY
PLANNING DEPARTMENT

PHONE: (209) 223-6380
FAX: (209) 223-6254
WEBSITE: www.amadorgov.org
E-MAIL: planning@amadorgov.org

COUNTY ADMINISTRATION CENTER • 810 COURT STREET • JACKSON, CA 95642-2132

**Notice of Preparation and Early Consultation Review
Notice of Scoping Session**

TO: Responsible agencies, trustee agencies, and other interested parties (See Attachment A, Distribution List)
FROM: Amador County Planning Department
DATE: September 14, 2021
PROJECT: Ione Quarry Expansion Project. Use Permit Amendment and Reclamation Plan Amendment for Specialty Granules (Ione), LLC (SGI). This project proposes to expand the existing footprint and depth of Ione Quarry to access additional rock reserves. This expansion requires an amended Conditional Use Permit and an amended Reclamation Plan. The project involves the following major components:

- 1) Extending the Use Permit expiration date from December 31, 2075 to December 31, 2175 at current annual production rates;
- 2) Enlarging the quarry's total surface disturbance from +/-56 acres to +/-136 acres;
- 3) Increasing the quarry's floor depth from +/-325 feet above sea to +/-280 feet below sea level; and
- 4) Expanding overburden storage stockpiles on-site from +/-34 acres to +/-86 acres and increase elevation from +/-350 feet above sea level to +/-560 feet above sea level.

Applicant: Specialty Granules (Ione) LLC (SGI); Mine ID 91-03-0011

Supervisorial District: 2

Location: 1900 State Highway 104 Ione, CA 95640, 500 feet east of the intersection with Michigan Bar Road, and approximately two miles west of the City of Ione; APNs 005-080-016-502 and 005-080-020-000.

General Plan designation: MRZ (Mineral Resource Zone)

Zoning district: R1A (Single-family Residential and Agriculture)

The project application materials are available for viewing at:

<https://www.amadorgov.org/departments/planning/current-projects>

REVIEW: The California Environmental Quality Act (CEQA) Section 15082 states that once a decision is made to prepare an Environmental Impact Report (EIR), the lead agency (Amador County) must prepare a Notice of Preparation (NOP) that an EIR will be prepared. The purpose of the NOP is to provide sufficient information describing the proposed project and its potential environmental impacts to enable responsible agencies, trustee agencies, and other interested parties to prepare and or present a response regarding the scope and content of the information that should be included in the EIR. Agencies shall focus on the content of the environmental information that is within their particular statutory responsibilities related to the proposed project.

In addition, comments regarding the scope of environmental review are being solicited from the public. Topics examined under CEQA include, but are not limited to the following: Aesthetics, Agriculture and Forestry Resources, Air Quality, Biological Resources, Cultural

Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards & Hazardous Materials, Hydrology and Water Quality, Land Use & Planning, Mineral Resources, Noise, Population & Housing, Public Services, Recreation, Transportation & Traffic, Utilities & Service Systems, Tribal Cultural Resources, Wildfire Risks, and Mandatory Findings of Significance.

The Public Scoping Session will take place during a Special Meeting of the Amador County Planning Commission on **Tuesday, October 5, 2021 at 7pm** in the Board of Supervisors Chambers at the Amador County Administration Building, 810 Court Street, Jackson, California, as well as via teleconference, accessible through this link: <https://us02web.zoom.us/j/5375128983> or by calling one of the numbers below:

+1 669 900 6833 US

+1 346 248 7799 US

+1 301 715 8592 US

+1 312 626 6799 US

+1 929 205 6099 US

+1 253 215 8782 US

Meeting ID: 537 512 8983

Following this Scoping Session, a Draft EIR will be prepared to respond to the issues which have been raised by the public and responding agencies. Once the Draft EIR is complete, a public hearing will be held on the adequacy of the document. The certification of an EIR as being adequate is not an indication the County will or will not eventually approve the project; it simply means the environmental impacts have been fully disclosed and adequate mitigation measures have been recommended. If the EIR is certified as adequately addressing environmental concerns, the County can then move forward with a decision to approve or deny the project.

All interested persons are invited to attend this Scoping Session and state their concerns. If you are unable to attend the meeting, you may submit your concerns in writing prior to 5:00 PM on October 5, 2021. *Please keep comments focused on environmental impact issues at this preliminary stage of review rather than arguments for, or against, the project.*

If you have questions or desire more information, please view the application materials at <https://www.amadorgov.org/departments/planning/current-projects> or contact the Amador County Planning Department at (209) 223-6380 or planning@amadorgov.org.

Attachment A: Distribution List

Amador County Transportation Commission
Amador Fire Protection District
Amador Air District
Amador LAFCO
Amador Transit
Amador Water Agency
Amador County Building Department
Cal Fire
Caltrans, District 10
CA Dept. of Fish & Wildlife, Region 2
CA Division of Mine Reclamation
Amador County Counsel
Amador County Environmental Health Department
Amador County Sheriff's Office
Amador County Surveying Department
California Highway Patrol, Amador Office
Amador County Transportation and Public Works Department
Amador County Waste Management Department
City of Ione
Buena Vista Band of Me-Wuk Indians
Calaveras Band of Mi-Wuk Indians
Ione Band of Miwok Indians
Jackson Rancheria Band of Miwuk Indians
Shingle Springs Band of Miwok Indians
United Auburn Indian Community of the Auburn Rancheria
Washoe Tribe of Nevada and California

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APPENDIX A-2
COMMENTS ON THE NOTICE OF PREPARATION

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Specialty Granules mine

troxmusic@aol.com <troxmusic@aol.com>

Tue, Sep 28, 2021 at 12:45 PM

Reply-To: troxmusic@aol.com

To: "planning@amadorgov.org" <planning@amadorgov.org>, "infofogi2021@gmail.com" <infofogi2021@gmail.com>, troxmusic@aol.com

Att. County Planning,

Once again we are all asked to sacrifice our peace of mind (and health) for another single business here in lone.

I attended the board meeting some time ago regarding the "moto cross" debacle with silica dust right next to our residence in Wild Flower (not to mention the noise and traffic). Who even considers such a fiasco?

I am familiar with the Specialty Granules operation and have noticed them ramping up for some time. The truck traffic has increased and I remember driving past a terrible accident out there involving one of their trucks, not too long ago. The traffic coming into lone from that direction (intersection at the Chevron, Main St. Etc is already the pits when the prison or school is changing shifts.

lone is growing precisely because we don't have the problems of east L.A. : Large trucks on the 10 Freeway, pit mines, racetracks, etc.

And please remember:

Adding thousands of new residence (Castle Oaks and Wildflower) means tremendous increases in water usage by the very people who are moving here, buying new homes...the new homes whose Permit Fees ALONE help so much to fund Amador Water's current and future needs... if they are used properly.

My main concerns:

1. Heavy truck traffic
2. Water usage
3. No benefit to 99% of our lone citizens

I would like to know WHY you would consider allowing SGI to expand it's operation in such an unfettered fashion.... just what is in it for our fair city? Our town is still "desirable". You and all of us should be absolutely committed to keeping it that way!

Dan Troxell
lone resident for many years

California Department of Transportation

OFFICE OF THE DISTRICT 10 PLANNING
P.O. BOX 2048 | STOCKTON, CA 95201
(209) 948-7325 | FAX (209) 948-7164 TTY 711
www.dot.ca.gov



September 30, 2021

Mr. Chuck Beatty, Planning Director
Amador County Planning Department
810 Court Street
Jackson, CA 95642

AMA-104-PM 2.145
lone Quarry NOP (Notice of
Preparation of an EIR)
SCH 2021090179

Dear Mr. Beatty,

The California Department of Transportation (Caltrans) appreciates the opportunity to comment on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR). This project proposes to expand the existing footprint and depth of lone Quarry to access additional rock reserves. This expansion requires an amended Conditional Use Permit and an amended Reclamation Plan. The project involves the following major components:

- 1) Extending the Use Permit expiration date from December 31, 2075, to December 31, 2175, at current annual production rates
- 2) Enlarging the quarry's total surface disturbance from +/-56 acres to +/-136 acres
- 3) Increasing the quarry's floor depth from +/-325 feet above sea to +/-280 feet below sea level
- 4) Expanding overburden storage stockpiles on-site from +/-34 acres to +/-86 acres and increase elevation from +/-350 feet above sea level to +/-560 feet above sea level.

The proposed quarry expansion is located on 1900 State Route (SR) 104 in lone, approximately 500 feet east of the intersection with Michigan Bar Road, and approximately two miles west of the City of lone.

The Assessor Parcel Numbers (APN) are 005-080-016-502 and 005-080-020-000.

Caltrans has the following comments:

As part of the transportation analysis, include potential impacts to SR 104.

Mr. Beatty, Planning Director
September 30, 2021
Page 2

Caltrans suggests Amador County continue to coordinate and consult with Caltrans to identify and address potential cumulative transportation impacts from this project and other developments near this location. This will assist Caltrans in ensuring that traffic safety and quality standards are maintained for the traveling public on existing and future state transportation facilities.

Encroachment Permits

If any future project activities encroach into Caltrans Right-of-Way (ROW), the project proponent must submit an application for an Encroachment Permit to the Caltrans District 10 Encroachment Permit Office. Appropriate environmental studies must be submitted with this application. These studies will analyze potential impacts to any cultural sites, biological resources, hazardous waste locations, and/or other resources within Caltrans ROW at the project site(s). For more information, please visit the Caltrans Website at: <https://dot.ca.gov/programs/traffic-operations/ep/applications>

Please contact Paul Bauldry at (209) 670-9488 (email: paul.bauldry@dot.ca.gov) or me at (209) 483-7234 (email: Gregoria.Ponce@dot.ca.gov) if you have any questions or concerns.

Sincerely,

Gregoria Ponce'

Gregoria Ponce, Chief
Office of Rural Planning

cc: State Clearinghouse

Central Valley Regional Water Quality Control Board

1 October 2021

Chuck Beatty
Amador County
810 Court Street
Jackson, CA 95642
planning@amadorgov.org

COMMENTS TO REQUEST FOR REVIEW FOR THE EARLY CONSULTATION, IONE QUARRY EXPANSION PROJECT 2021 (AMENDED USE PERMIT AND RECLAMATION PLAN), SCH#2021090273, AMADOR COUNTY

Pursuant to the State Clearinghouse's 15 September 2021 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Early Consultation* for the Lone Quarry Expansion Project 2021 (Amended Use Permit and Reclamation Plan), located in Amador County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental

KARL E. LONGLEY SCD, P.E., CHAIR | PATRICK PULUPA, ESQ., EXECUTIVE OFFICER

Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:

http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:

https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_2018_05.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ. For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml

Waste Discharge Requirements – Discharges to Land

Before beginning mining, the property owner and operator (together) are required to have WDRs or other documents from the Regional Water Quality Control Board allowing discharge to land of mining waste. Mining waste as defined in the Porter-Cologne Water Quality Control Act is, “all solid, semisolid, and liquid waste materials from the extraction, beneficiation, and processing of ores and minerals. Mining waste includes, but is not limited to, soil, waste rock, and overburden, as defined in Section 2732 of the Public Resources Code, and tailings, slag, and other processed waste materials, including cementitious materials that are managed at the cement manufacturing facility where the materials were generated.” This definition is very broad and covers all mining materials. Therefore, if you are planning to mine a report of waste discharge must be submitted with the proper filling fees. For more information on waste discharges to land from mining activities, visit the Central Valley Water Board website at:

https://www.waterboards.ca.gov/centralvalley/water_issues/mining/

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: <https://www.waterboards.ca.gov/centralvalley/help/permit/>

If you have questions regarding these comments, please contact me at (916) 464-4856 or Nicholas.White@waterboards.ca.gov.



Nicholas White
Water Resource Control Engineer

cc: State Clearinghouse unit, Governor’s Office of Planning and Research,
Sacramento



SGI


korte4@gmail.com <korte4@gmail.com>
To: planning@amadorgov.org

Sun, Oct 3, 2021 at 3:10 PM

Attached are my comments.

Mark Korte

Ione Resident

 SGI expansion comments.docx
225K

SGL expansion comments

You need not look any further than the currently operated plant to see issues that will only grow with the expansion.

- There is no dirt grates for the trucks exiting currently employed so all the dirt on the tires gets transferred to the roadway, that is not only an eyesore on the new pavement just put down on the highway but it likely to get slippery when wet.
- Trucks do not have a level entry to the highway so fully loaded trucks will want to “get a run for it” to get onto the highway or in other words “an accident waiting to happen”
- Trucks are allowed to leave the facility without covers over the loads, not only against California and most States regulations but dangerous to those cars unfortunate enough to have to follow them.
- There was some dirt work in front of the plant the other day that had a water truck there for dust suppression, but I guess it was there just for looks. I had to drive through a cloud of dust that was thick enough I could not see but just a few feet.

The bottom line is, the plant is not being operated properly now- so why would permission be granted for an expansion let alone if the notice I got was correct an expansion with limited future oversight. I have run plants of similar size and I would be embarrassed to apply for an expansion with this sloppy an operation. This is a good neighbor thing, and they are failing.



The truck just came from the plant



Ione Gravel Mine Comments

P Kov <contact.pkov@gmail.com>

Sun, Oct 3, 2021 at 11:34 AM

To: planning@amadorgov.org

Hello,

I agree that the Ione Gravel Mine should be allowed to continue operations but not without accountability to the Count of Amador and the people of Ione.

Therefore I do not support the Ione Gravel Mine option to be allowed to operate with a 125-year operating permit with no periodic environmental or public health review.

The Gravel Mine on Highway 104 should be held accountable for with limits for the following:

1. Air Quality Index
2. Tons of toxic dust
3. Heavy truck traffic through Ione
4. Health Hazards
5. Blasting noise
6. Light and glare at night
7. **Water Usage and pollution standards**

Thank you.

Paul Kovacik (Resident of Ione - Castle Oaks Subdivision)

--

Reserve your right to think, for even to think wrongly is better than not to think at all.

Dear Amador County

My family and I live at 10300 Dutschke Road, next door to SGI, along with our neighbors. Like our many in the lone valley, we have a multi-generational family ranch business since 1973. We produce show cattle, beef and walnuts for the last 48 year. We love our home and it will stay in the family. On a personal note, my father Col. Fraser West and my husband John Moore both died here, so this is a holy place for me.

For the last decade, we have endured and reported to the County overwhelming rock crushing, conveyer belt and blasting noises, pillars of visible dust, glaring night lights, dozens of daily gravel trucks racing down the 104 and through lone – untarped, with quarry dust clouds around them, and highly visible mountains of unreclaimed toxic tailings more than 100 feet high. We know that SGI operation uses irresponsible amounts of precious local groundwater, from a deep water well threatening the overtaxed aquifer that we need for our home and ranch. Despite letters and complaints, SGI operations are now routinely conducted 5-6 nights a week. The County has disregarded all of this, and now, with SGI's proposal for an unlimited 125 year permit, we seek action immediately by the County on these urgent issues.

I acknowledge that SGI has a business, but so do we as well as the many ranchers and farmers in the lone Valley. Also, in this day and age, probably over half of the homes in lone have some kind of home-based businesses. We opposed the County's approval of the Newman Ridge mine, not 800 feet from our back door, when the County won on a technicality after 9 years of litigation which cost our family thousands and thousands of dollars that we could not afford. So at some point in the future we could have a mine behind us, as well as a mine for a century to our left, along with US mining activity in front of us along the 104. We are surrounded by noise, toxic dust, trucks, and our water, crucial to our business, is threatened daily.

My question is, why? Why does the County always side with the mining industry? This is not the gold rush days. This is 2021, and this is a known super-polluting industry, yet every mine receives full support from the County. What about the homeowners and small business owners that contribute far more to the County's economy than whole sale product that is shipped out of the county? The business owners in lone, who provide far more jobs than a mine, will be collectively injured by the vast expansion of this mine. We all wonder,

why does our government not care about us? Why should one kind of business have the right to overwhelm and injure another? Why does one business landowner have the right to ignore, injure and trample another group of landowners? Where are our rights? What right does a business have to disrupt landowners that have been here decades before they were? Why is the County not protecting us?

In 1989 SGI's location received its small gravel pit permit from Amador County. It was not a mine. SGI's current, old, grandfathered-in Conditional Use Permit (CUP) from 1989 should be revoked for many the many complaints, violations , infractions and disregard for Public Health. The facts are that the pit itself is now 20 times the size it was even 10 years ago. This is a major change and due to the amount of earth dislodged and destroyed, it is no longer technically a gravel pit, it is a mine, operating illegally without a mining permit accompanied by the correct CEQA oversight.

To remedy this, a proper CEQA EIR and review, with processes for public input at every step of the way, needs to be conducted by Amador County, fairly, to ensure that the appropriate safeguards and mitigation are completed for the Public. An EIR written by an independent third party, not hired by SGI.

The effects of the mining operation are closer than 2 miles. Mule Creek Prison and Castle Oaks and lone housing are within 2-3 miles which add literally thousands of people to our local population. This is a vast difference from 1989 when the old permit was issued.

Prisoners and prison staff at Mule Creek Prison have the same rights as the general Public and should not be subjected to health damaging quarry dust and noise



pollution. Indeed, a prison is defined as *an environmentally sensitive receptor* as the inmates and staff literally have nowhere else to go and must breathe this toxic dust. Additionally, the prison population is known to be litigious, and if the County does not uphold their right to Public Health, the Prison population could sue not only SGI but Amador County, who would be knowingly allowing violations to their rights. A large lawsuit of this kind could be disastrous to Amador County, whose budget and insurance could not withstand this kind of action.



Traffic - Despite SGI's insistence that the trucks coming and going from the SGI location do not belong to SGI, specifically for SGI's current Conditional Use permit (CUP) truck traffic through Lone is not permitted. The operation should be fined by the County for the last 10 years for *assisting and encouraging* this damaging truck traffic through Lone, which is dangerous to the general population.

The city of Lone is very difficult to navigate due to narrow 2-lane roads, with several severe 90 degree turns, (which caused at least one recent truck accident). Lone is has a large population of children, seniors, and veterans, which travel on foot or in wheelchairs or electric carts. Several of the streets in Lone have no sidewalks. Lone also has several corners that carry the worst the level of service (LOS) ratings, yet trucks carrying SGI products - both open bed and tanker trucks - show no regard for

this flagrant violation of the current CUP. Amador County needs to step in now to protect these residents.

Air Quality: Without a combination of cumulative air quality from the entire operation including the pit, the road, the area between pit and plant and the plant itself when it is running, when diesel trucks are idling and loading, an air inspection is meaningless. Amador County needs to do real inspections, of the entire operation, using real data against a real baseline, and provide to us that information. There are no air monitoring stations in lone. The nearest one is 32 miles away. We ask that the County rectify this terrible oversight as a super air polluting industry exists here.

Each day, heavy quarry dust is visible on our homes, barns, vehicles, and pastures, up to ½ inch per day from the SGI mine pit, conveyor belts and rock crushers. Plumes of quarry dust are clearly visible day and night, so dust controls are not effective.

Noise - the heavy, persistent, high levels of noise we are experiencing is not blasting. SGI is in noise violation on a regular basis between 10 pm and 7 am. Specifically, noise pollution can contribute to sleep deprivation and can contribute significantly to hypertension, heart disease, hearing loss, and more. The American Public Health Association has a lot to say about this kind of noise and health.

<https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/16/12/50/environmental-noise-pollution-control>

We want this noise monitored and limited.

The tailings stockpiles were created by this pit and are observably **growing**. SGI is responsible for cleaning up these 100-foot-high toxic tailings, instead of adding to their size daily, which is what is happening right now, right in front of us.

In conclusion: we want a full CEQA compliant EIR conducted, with SGI prepared to make mitigation both at the site and to the community. We want a local wind and air monitoring stations. We want limited hours, reduce the night lights, handle the noise and truck traffic, cap the water usage and to have runoff and wastewater abated. Any permit should have a 20-year cap. We want reclamation of the existing tailing stacks and other unreclaimed areas before any mining continues. All other approved projects and their cumulative environmental issues should be taken into consideration as well: Newman Ridge and the Mule Creek Prison expansion to name just two.

Above all, we also want SGI to acknowledge the burden the mine places on the

Community, and to give back to the Community in the form of a 300 acre conserved regional park, available to all with much needed low elevation hiking and spectacular views of the lone Valley and the Sierras. There is a perfect spot for this, directly adjacent to SGI. It's been called Newman Ridge, and it is pristine, full of wildlife and would be wonderful for hiking and tourism.

Sondra West-Moore and Family
10300 Dutschke Road
lone, CA 95640



October 4, 2021

Chuck Beatty
Amador County
Planning Department
810 Court Street
Jackson, CA 95642-2132

Copy sent via email: planning@amadorgov.org

SUBJECT: NOTICE OF PREPARATION AND EARLY CONSULTION
LONE QUARRY EXPANSION PROJECT (SCH# 2021090273)
CA MINE ID# 91-03-0011

Dear Mr. Beatty:

Thank you for including the Department of Conservation's Division of Mine Reclamation (Division) in the environmental review process for the Lone Quarry Expansion Project (Proposed Project) Notice of Preparation (NOP) and early consultation. The NOP indicates that Amador County (County), as lead agency under the California Environmental Quality Act (CEQA), will prepare a draft Environmental Impact Report (EIR) for the Proposed Project.

As described in the NOP, the Proposed Project will amend the existing use permit and reclamation plan (RP) for the Lone Mine (CA Mine ID# 91-03-0011) to allow for the expanded proposed mining area from approximately 56 acres to approximately 136 acres and the increase the depth of mining by 605 feet (ft.; proposing to mine to 280 ft. below mean sea level (MSL), compared to the existing approved conditions of mining to depth of 325 ft. above MSL). The stockpile total surface disturbance area would increase from 34 acres to approximately 86 acres and have a maximum elevation of 560 ft. above MSL.

The Division's primary focus is on active surface mining operations; however, the Division also addresses issues related to abandoned (pre-1976) legacy mines. Additionally, the Division has review responsibilities associated with lead agency implementation of SMARA. SMARA provides a comprehensive surface mining and reclamation policy to assure that:

- Adverse environmental effects of surface mining operations are prevented or minimized and mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses
- Production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment
- Residual hazards to the public health and safety are eliminated

Mr. Chuck Beatty
NOP for draft EIR (SCH No. 2021090273)
October 4, 2021

Division staff has reviewed the subject NOP pursuant to CEQA Statutes and Guidelines and offers the following comments:

Comment 1:

The Division recognizes that there is a February 2021 Reclamation Plan Amendment (RPA) that is part of the documentation for the draft EIR, and that this RPA has been prepared prior to CEQA review. The Division notes that the CEQA review may include the approval of mitigation measures to reduce impacts that may pertain to the reclamation of the mined lands. The County may want to consider including these type of mitigation measures in the RPA when they submit the document to the Division for review and comment pursuant to SMARA requirements.

Comment 2:

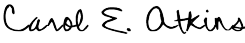
The Division looks forward to reviewing the environmental baseline discussion presented in the draft EIR and the presentation of mitigation measures to minimize impacts from the surface mining activities. The Division recognizes the special plant communities on site, including the Blue Oak woodlands and vernal pools. The Division further recognizes the requirements in the Amador County General Plan Open Space Element, which "includes discussion of the County's sensitive biological resources including oak woodland habitat, wetlands, riparian habitats, and other sensitive communities, and special-status species."

Comment 3:

Division staff will provide specific comments on the RPA for this proposed mining activity once the Division receives the complete RPA and any supporting documents, along with the statement from the County that certifies the submission as complete and in accordance with PRC Section 2772.1(a)(3)(A-C). Additionally, Division staff will provide comments on the financial assurance cost estimate for the Proposed Project in accordance with PRC Section 2773.4(a-d).

The Division requests to be included on the distribution list for this Proposed Project. Additionally, the Division requests that any subsequent project documents (e.g., the draft EIR, hearing notices for the draft and final EIRs, and any supplemental environmental documents), as well as a copy of the certified final EIR, be sent to the Division at DMR-Submittals@conservation.ca.gov or the mailing address on the bottom of page 1 of this letter. If you have any questions, please contact me at (916) 323-9198.

Sincerely,

DocuSigned by:

73ECCB6738194DA...
Carol E. Atkins, Manager
Environmental Services Unit

ec: State Clearinghouse, state.clearinghouse@opr.ca.gov

Department of Conservation, Office of Legislative and Regulatory Affairs,
OLRA@conservation.ca.gov



Ione Quarry Expansion Project

1 message

John Muschetto <jmuschetto@hotmail.com>

Mon, Oct 4, 2021 at 4:08 PM

To: "planning@amadorgov.org" <planning@amadorgov.org>

We are John and Kathleen Muschetto who wish to express our concerns over the environmental impact of expanding the Special Granules Ione Quarry. We are located at 10930 Dutschke Road, Ione and are one of the closest residents to the quarry.

Air quality needs to be addressed in the EIR. Expanding the footprint and depth will add to the pollution of dust and toxins that are already hanging in the air. Currently, we are not aware that the air quality is monitored or if sensors are located in the vicinity. We would like to see it mitigated to have sensors close to the plant and the results be available to the public. We would like the EIR to address the cumulative effects this expansion will have on air quality as industrial manufacturing operations develop in the newly designated industrial park located within 2 miles of SGI. Also the cumulative effects when the future Newman Ridge Project is up and operating. It is within two miles of SGI also.

This EIR should also address how much groundwater will be needed to support this expansion and is there enough groundwater to sustain it for another century. SGI sits on the Cosumnes Sub-basin and draws its water from this extremely overdrawn aquifer. We are concerned that the increased water usage by this expansion will affect our wells as well as the neighboring ranches and residents water supplies. We are all supplied by the same aquifer and our wells are already struggling.

The EIR should restrict the hours of operation. This ties into the noise factor. This plant already emits extreme amounts of noise which is intolerable at night. There is the noise of excavating, blasting, crushing rocks, running conveyor belts, loud hammering on the silos, trucks driving in and out of the quarry, and the diesel train engines that come in the middle of the night. They blast their airhorns, loudly clanging their train cars while connecting and disconnecting them to the train. With increased productivity, there will be increased noise. The hours of operation should be mitigated in the EIR.

The EIR needs to also address the amount of truck traffic this expansion will create. Downtown Ione is extremely congested right now. This EIR needs to address that problem and not let this project add to it. Currently, trucks back up every morning at the entrance to SGI all the way past the entrance to Dutschke Road. There is no left hand turn lane at either entrance and this creates a dangerous traffic hazard. This occurs right at the peak of commute time for people working in the Galt, Elk Grove or Sacramento area. With the potential increase of truck traffic on Highway 104 and the potential for more trucks backed up on the highway, this EIR needs to address the situation and mitigate for two left hand turn lanes for both Dutschke Road and the SGI entrance.

Lastly, with the request of such a long operating permit, we would like to see the EIR require periodic environmental reviews that are open to public.

RECEIVED

OCT 04 2021

AMADOR COUNTY
PLANNING DEPARTMENT

OCTOBER 2, 2021

AMADOR CO. COMMUNITY DEVELOPMENT AGENCY
ATTN: PLANNING DEPARTMENT
810 COURT STREET
JACKSON, CA 95642-2132

RE: IONE QUARRY EXPANSION PROJECT
SEPTEMBER 10, 2021 NOTICE

DEAR PLANNING DEPARTMENT:

THIS LETTER IS TO STRONGLY OPPOSE
THE EXPANSION OF THE EXISTING FOOTPRINT
AND DEPTH OF THE IONE QUARRY. SINCE
I LIVE JUST 3 MILES FROM THIS QUARRY,
I AM EXTREMELY CONCERNED ABOUT THIS
PROPOSED EXPANSION!!!

- IT WOULD EXTEND THE USE PERMIT BY
100 YEARS - A RIDICULOUS & ENORMOUS
EXTENSION OF TIME!
- IT WOULD ENLARGE THE QUARRY'S TOTAL
SURFACE DISTURBANCE BY 80 ACRES,
MORE THAN DOUBLE THE CURRENT 56
ACRES!
- IT WOULD INCREASE THE QUARRY'S FLOOR
DEPTH BY OVER 600 FEET!

THESE CHANGES WOULD CAUSE MANY
POTENTIAL ADVERSE EFFECTS TO THE
LOCAL IONE ENVIRONMENT:

- POOR AIR QUALITY AND INCREASED
AIR POLLUTION CAUSED BY GREENHOUSE
GAS EMISSIONS.
- HYDROLOGY AND POOR WATER QUALITY
DUE TO CONTAMINATION OF OUR WATER

PAGE 2
OCTOBER 2, 2021
IONE QUARRY EXPANSION PROJECT

DRINKING SUPPLY, THUS LOWERING
OUR PROPERTY VALUES AND INCREASING
OUR WATER COSTS.

- INCREASED TRAFFIC ON HIGHWAY 104
WHICH HAS JUST ONE LANE IN EACH
DIRECTION.

- NOISE AND DUST POLLUTION FROM THE
INCREASED EXPANSION.

- OTHER ENVIRONMENTAL CONCERNS
INCLUDE USE OF HAZARDOUS MATERIALS,
AESTHETICS AND UTILITIES.

IN SUMMARY, I'M ABSOLUTELY OPPOSED
TO THIS VAST EXPANSION OF THE IONE
QUARRY, AND WISH TO BE NOTIFIED OF
ANY AND ALL FUTURE MEETINGS REGARDING
THIS MASSIVE PROPOSED EXPANSION!

THANK YOU,

Kathy Strong

KATHY STRONG

1716 SHAKELEY LN

IONE, CA 95640

(925) 481-1476



SGI Quarry expansion Scoping Comment Letter

Emily Moloney <emily@buenavistatribe.com>

Tue, Oct 5, 2021 at 4:59 PM

To: "planning@amadorgov.org" <planning@amadorgov.org>

Cc: Mike DeSpain <mike@buenavistatribe.com>, Ivan Senock <ivan@bvtribe.com>

Good afternoon Amador Planning Dept,

Please see attached scoping comment letter submitted by the natural resources department staff for Buena Vista Rancheria of Me-Wuk Indians.

Thank you,

Emily Moloney

Water Program Coordinator

Buena Vista Rancheria of Me-Wuk Indians

1418 20th Street, Suite 200

Sacramento, CA 95811

(c) (530) 514-8714

(o) (916) 491-0011 ext 259

(f) (916) 491-0012

emily@buenavistatribe.com

BVR_Scoping_Comment letter_10052021.pdf
186K



October 5, 2021

Amador County Community Development Agency
Attn: Planning Department
County Administration Center
810 Court Street
Jackson, CA 95642-2132

RE: Notice of Preparation, Notice of Scoping Session for Ione Quarry Expansion Project. Use Permit Amendment and Reclamation Plan Amendment for SGI

Greetings Amador County Planning Department,

Buena Vista Rancheria of Me-Wuk Indians (BVR) is a federally recognized Indian Tribe with ancestral lands ranging from approximately the eastern bounds of the Sacramento and San Joaquin River Delta and to the east to include the western slope of the northern Sierra Nevada mountains. BVR holds fee and trust lands within Amador County. BVR is writing to provide comment regarding the scope and content of the environmental analysis and environmental documentation to Amador County Planning Department regarding the Specialty Granules Ione, LLC (SGI) Ione Quarry Expansion Project.

BVR understands that SGI seeks to expand its operational footprint from 56 acres to 136 acres, increase the depth of the quarry to 325 to 280 feet below sea level, and expand its overburden storage stockpiles from 34 acres to 86 acres with an elevation increase from 350 ft to 560 feet above sea level. Simultaneously, SGI seeks to extend its mining operational permit from 2075 to 2175. BVR reviewed the documentation and initial environmental analyses provided on the Amador County Planning department's Project website. BVR has specific concerns regarding impacts to cultural resources, environmental resources (especially water), transportation, and encourages a thorough Environmental Impact Report (EIR) that includes a comprehensive review into the aforementioned topics, all of the resource categories listed in the *Notice of Preparation and Early Consultation Review - Notice of Scoping Session* letter, and an analysis of a no project alternative. BVR does not support this project and recommends the Amador County deny SGI's expansion proposal for SGI due to impacts related to ecological, cultural, and archaeological resources. BVR offers these scoping comments as this project moves through the CEQA process.

- Analyze the impact on groundwater resources affected by the mining activities
 - Pumping of groundwater from the quarry to access the ore body
 - Page 30 of the Hydrology and Water Quality Analysis Report prepared by EMKO Environmental Inc. describes groundwater in the caused by quarry deepening and stormwater runoff will be pumped to Loch Lane Lake for "other beneficial uses." Loch Lane Lake is a local reservoir used for

Buena Vista Rancheria of Me-Wuk Indians
1418 20th Street Suite 200
Sacramento, CA 95811
Office (916) 491-0011
Fax (916) 491-0012



agricultural purposes, and has an outflow to Dry Creek, a tributary to the Mokelumne river. The Mokelumne River is a Traditional Navigable River as defined by the USEPA 40 CFE Part 120.2 and is protected by Clean Water Act (CWA) Section 402 Pollution Discharge Permits and CWA Section 303 Water Quality Standards and TMDLs. An NPDES permit would need to be obtained prior to discharging quarry groundwater to protected Waters of the United States (WOTUS). The same report described groundwater quality impairments such as nitrate, conductivity, aluminum, iron, and manganese to various wells. It is unacceptable to pump impaired water out of the ground and into surface waters. An analysis of groundwater quality and NPDES permit must be obtained.

- The EIR should also consider the feasibility and impacts of reinjecting the water back into the ground rather than to surface water.
- Analyze the water quality impairment potential in the quarry pit lake post mining and its effect on groundwater quality and groundwater levels.
 - Pit lakes are well known for creating perpetual pollution described in the Nevada Mining Association's 2018 Documentary, "Environmental Impacts of Mining," and exemplified with the Anaconda Copper Mine in Lyon County, NV now an EPA superfund site. EMKO's analysis describes Acid Rock Drainage (ARD) as an impact of the pit lake in the quarry. This has the potential risk to contaminate groundwater supplies indefinitely. This impact needs to be thoroughly analyzed and mitigated in the EIR. Additionally, the EMKO analysis falsely claims no impact to groundwater resources. It is well understood that in the process of a pit lake forming that lake is formed by a pressure gradient in the aquifer pulling the water into the lake. As the pit lake forms it lowers the groundwater table and takes groundwater away from the surrounding wetlands, springs, streams, rivers, lakes, ponds, meadows (Nevada Mining Association, 2018). In an already arid environment even a minimal lowering of the groundwater could impact aquatic ecosystems
- Analyze the effects of blasting agents on groundwater, surface water, and soil
 - Blasting agents such as ammonium nitrate/fuel oil has the potential to contaminate groundwater with nitrates and other chemicals, such as petroleum hydrocarbons (EMKO, 2020. pgs. 36, 41-42). Groundwater is already impaired for nitrates. Impact H-2 and mitigation measure H-2 describe semiannual nitrate sampling, but do not describe any monitoring for hydrocarbons. Hydrocarbons must be included in the mitigation plan in the EIR analysis
- Analyze stormwater impacts as they related to surface water quality



- Do these stormwater basins discharge to any other surface water bodies?
- Is there a plan for the stormwater basins if they do overflow or discharge by design to nearby waters? What is the water quality monitoring plan? Is there a stormwater NPDES permit in place?
- Analyze the stormwater impacts related to runoff and erosion of the constructed stockpile.
 - How will the stormwater conveyance system illustrated in Figure 4 and 7 of the Quarry Expansion Project Description be effectively built to convey stormwater as the stockpile is constructed as a work in progress?
 - Include the Stormwater Pollution Prevention Plan SWPPP in the EIR document to ensure it is consistent at mitigating impacts disclosed in the EIR
- Analyze impacts to surface water streams, wetlands, ponds, and vernal pools
 - WRA's 2020 Wetland Delineation report determined there are 3.58 potentially jurisdiction wetlands, 0.94-acres of non-wetland waters that are potentially jurisdictional. There are seasonal wetlands, vernal pools and ephemeral waters that would be removed by the quarry expansion, overburden soils and caprock stockpile areas. These habitats should be avoided or have impacts reduced as much as possible
 - Mitigation is currently expected to be 1:1 for acreage and habitat value
 - Where is the mitigation going to be located? In region out of region? Mitigation should be within the region to retain localized benefits.
 - Suggest no net loss and have robust mitigation plan in place. See CWA section 404 policy and guidance documents including 40 CFR Part 230.
- Analyze impacts to Traditional Cultural landscapes and forest ecosystems, including Oak Woodlands and create an oak mitigation and reforestation plan.
 - No analysis on impacts to oak woodlands and chaparral habitat. BVR estimates that 0.20 square miles or 126 acres of oak woodland habitat will be destroyed, and all wetlands, vernal pools and streams will be destroyed.
 - The 2021 Reclamation Plan prepared by the Amador County Planning Department provides a plan to revegetate the stockpile with native seed mix, however, has no reforestation plan for lost oak woodlands.
 - The reclamation plan ignores Amador County's own policies described in its 2016 General Plan.
 - Page 6 of the open space section describes, "The vernal pool complexes and Ione chaparral of western Amador County, and the riparian habitats along corridors such as the Cosumnes River, the Mokelumne River, and Dry Creek are examples of some of the sensitive communities found throughout the county. These sensitive communities are a part of the county's biological wealth and are home to some of its unique plant and



animal species. Future residential, commercial, and infrastructure development and expansion of agricultural or mining activities have the potential to directly remove, degrade, or fragment these sensitive habitats.”

- Open space Page 7 describes, “California Public Resources Code Section 21083.4 directs counties to require feasible and proportional habitat mitigation for impacts on oak woodlands as part of the California Environmental Quality Act (CEQA) review process. During CEQA review, the County is required to determine whether proposed projects “may result in a conversion of oak woodlands that will have a significant effect on the environment.”
- “The law prescribes four mitigation options: conserving oak woodlands through the use of conservation easements, contributing funds to the Oak Woodlands Conservation Fund to purchase oak woodland conservation easements, replanting trees (replanting cannot fulfill more than 50% of the required mitigation), and/or implementing other mitigation actions as outlined or developed by the County.”
- Analyze impact to renewable energy loss and electricity use
 - Project will destroy approximately 8.7- acres of solar panels.
 - How will SGI mitigate this loss in electricity and where will they obtain their energy supply?

The Area of Potential Effect (APE) lies within the traditional aboriginal territories of the Buena Vista Me-Wuk peoples, and thus BVR is concerned about the potential to disturbance to both recorded sites and undiscovered cultural resources. Due to the location of the Quarry and its expansion near traditional gathering sites and historic reservations subsurface archaeological site could be discovered. The Cultural Report presented by Golder associated Ltd cites newly discovered artifact isolates and one previously recorded archaeological site within the APE of the proposed quarry expansion. No consultation or outreach to BVR or other local Tribes was conducted for the preparation of the technical report. All field surveys and shovel test areas were conducted without a Tribal monitor present and without notification to interested Tribes.

- BVR requests SGI and Golder provide all Cultural Reports and Appendices to the Buena Vista Rancheria of Me-Wuk Indians Natural Resource department.
- During any construction or ground disturbance by the P-03-180 and Golder T-1 a Tribal Cultural Monitor be present with the archaeologist.
- Conduct additional field work with Tribal Monitors present to ensure cultural resources and/or ancestral remains are protected under Amador County General Plan and Implementation Plan Goal C-8 and Policy C-8-2.



- Include mitigation measures that if any cultural materials or ancestral remains are uncovered SGI is to contact all local Native American Tribes to discuss options for cultural resource protection.

In summary Buena Vista Rancheria of Me-Wuk Indians suggests critical analysis of impacts to the various water bodies, oak woodlands, Traditional Cultural Properties, renewable energy options surrounding the SGI Quarry. Additionally, BVR recommends more work on cultural resource surveys and fieldwork, inclusion of Tribal Monitors, and development of mitigation measures that protect and preserve cultural resources. BVR recognizes the scope of the SGI quarry expansion and potential impacts of the project. Revisions and further examination are critical prior to any further moment or development of the quarry expansion.

Respectfully,

/s/ Michael DeSpain

Michael DeSpain
COO and Natural Resources Director

/s/ Emily Moloney

Emily Moloney
Water Program Coordinator

A handwritten signature in black ink, appearing to read "Ivan Senock".

Ivan Senock, MA
Tribal Historic Preservation Officer (THPO)



Comments for SGI open pit mine expansion

BrianKaren Hlavaty <hlavaty4@volcano.net>

Tue, Oct 5, 2021 at 3:25 PM

To: "planning@amadorgov.org" <planning@amadorgov.org>

DO NOT support any expansion to the existing SGI mine site. The fact that SGI is attempting to expand the current mine site while ignoring EPA mandated inspections and reviews *AND* SGI is requesting an operating permit for 125 years with no periodic environmental or public health review, is indicative of how they would treat the surrounding neighbors in lone. We can hear the mine operation and rail cars at night already. I can't imagine what it would sound like with unopposed expansion without any permit regulatory inspections or reviews!!! As a concerned family living in the Castle Oaks subdivision we are *strongly* opposing any expansion to the existing SGI mine site operation.

Concerned citizens in lone

Sent from Mail for Windows



Scoping Comments for SGI Mine Expansion

Tom <tomi@volcano.net>
To: planning@amadorgov.org
Cc: Chuck Beatty <CBeatty@amadorgov.org>

Tue, Oct 5, 2021 at 10:48 AM

October 5, 2021












Dear Planning Department,

Scoping comments for the SGI Mine Expansion are attached.

Sincerely,

Tom Infusino

11 attachments

-  **SGI Mine Expansion Permit Scoping Comments.pdf**
326K
-  **Attachment A - CEQA Checklist for SGI Mine Expansion.pdf**
697K
-  **Attachment B - Basic CEQA Requirements for an EIR.pdf**
217K
-  **Attachment C - Alternative.pdf**
390K
-  **Attachment D - Fraser West Park Overview.pptx**
5952K
-  **Attachment E - San Rafael Quarry Permit esrrq_permit_mit_merge.pdf**
356K
-  **Attachment F - San Rafael Quarry Mitigation Monitoring.pdf**
285K
-  **Attachment G - BAAQMD CEQA_Air Quality Guidelines.pdf**
5235K
-  **Attachment H - Consistency with the General Plan.pdf**
505K
-  **Attachment I - Colonel Fraser E. West Bio.pdf**
96K
-  **Attachment J - MSDS for Roofing Granules & Silicosis Information.pdf**
1649K

Thomas P. Infusino, Esq.
P.O. Box 792
Pine Grove, CA 95665
(209) 295 8866
tomi@volccano.net

October 5, 2021

Amador County Planning Department (Sent by email)
810 Court Street
Jackson, CA 95642

RE: Response to Notice of Preparation of a DEIR for the SGI Mine Expansion Permit

Dear Director Beatty,

My name is Tom Infusino, and I am presenting these comments on behalf of Foothill Conservancy and Friends of Greater Ione. Thank you for the opportunity to suggest potentially significant impacts that should be evaluated in the upcoming environmental impact report. Please consider the adopting the potentially feasible mitigation measures and the alternative we propose. Please consider working with us and the applicant to craft accommodations that could be included in the approval of the project.

As you know, Foothill Conservancy is a non-profit organization with a mission to protect, restore, and sustain the natural and human environment in Amador and Calaveras counties for the benefit of current and future generations. The organization's core values include supporting sustainable community based solutions that promote economic prosperity, social well-being, and environmental protection. The organization values transparent government decision making based upon facts, science, and the law.

Friends of Greater Ione is an association of people residing and/or working in the City of Ione or on the unincorporated lands outside of the city. They seek to protect the area from threats to the groundwater supply of local ranches, threats to the health of local children and elders, and threats to their rural and small-town quality of life. They seek to secure conditions and mitigation measures on future projects approved by Amador County and the City of Ione.

A) Background and Project Description

According to the project description provided with the application, the quarry has operated on the site for 31 years. The proposed expansion would dramatically increase the scope of the project in space and time. The proposed project would expand the surface area disturbed by the mining (from 155 acres to 290 acres), the depth of mine (from 325 msl down to 280 msl), the area covered by stockpiles (from 36 to 86 acres) and the height of the stockpiles (from 70 feet to 200 feet). It would also extend the operation 100 years (from 2075 to 2175). No increase in the rate of annual production is proposed. To accomplish this expansion requires an amendment to

both the Conditional Use Permit and the Reclamation Plan. (The granules plant is operated under a separate CUP and is not part of this project.)

The project is accessed from Highway 104. The current quarry is about 125 feet deep. The current stockpiles are 60-70 feet high. Zoning for the site and surrounding lands is Single Family Residential and Agriculture (R1-A). Surrounding lands are suitable for residences, growing crops, and grazing livestock, and many are so used.

Over the next 154 years, the mine could continue to be operated 24 hours per day, 7 days per week, removing about 158 million tons of overburden topsoil, cap rock, and hard rock. Blasting could continue Monday – Saturday, 9 am-6 pm, up to 80 times per year. The mine would continue to use groundwater. Annual production would be about 600,000 tons of material per year.

When “reclaimed”, the benches and high walls of the quarry will not be revegetated, and the quarry will only partially fill with water up to 105 msl. That is, it will look like a hole over 250 feet deep with water at the bottom immediately adjacent to a 200 foot high revegetated stockpile mountain.

The biggest problem with the proposal is that the requested additional permit duration begins more than 50 years from now and then extends for another century. This makes meaningful environmental review and impact mitigation nearly impossible. Predicting the environmental conditions a century and a half from now is not feasible. Others in the industry seek permit extensions nearer to the expiration of their existing permit, and then only for an additional 30 years. (See Project Description sections in Exhibits 1 - Pacifica Rock Quarry Expansion Project DEIR, Exhibit 2 - Boca Quarry Expansion Project RDEIR.) This allows for meaningful environmental review and impact mitigation. If another extension is needed in 30 years, then that extension can be properly considered by that Board of Supervisors in light of the environmental conditions at the time, and state-of-the-art impact mitigation technologies. We strongly encourage the County **not** to extend the existing permit duration for the SGI Mine which already lasts through 2075. If the County is intent on providing the extension, then mechanisms need to be put in place for periodic re-assessment of impacts, mitigation measures and permit conditions, to ensure that state-of-the-art measures remain in place to protect the health, safety, and well-being of local residents and project employees.

B) Potentially Significant Impacts to evaluate in the Draft EIR.

Attachment A is an initial study checklist identifying potentially significant impacts for evaluation in the upcoming draft environmental impact report for the proposed mine expansion. It suggests that the project may have significant impacts to agriculture, air quality, biological resources, cultural resources, energy, greenhouse gas emission, hazardous materials, hydrology, land use planning, mineral resources, noise, housing, public services, transportation, tribal cultural resources, and utilities. **Exhibits 1 and 2** are EIRs on quarries that may help you with your evaluation of these impacts. **Attachment J** provides information on health effects of exposure to silica and roofing granules. Please assess such health effects in the DEIR. We also incorporate by reference into the administrative record the groundwater shortage information,

and the information demonstrating a lack of available treated surface water, provided to the County by commenters on the Edwin Lands rezoning in 2020. Please use this information in assessing the water supply impacts of the proposed project.

C) Basic CEQA Requirements for a Project EIR.

In **Attachment B**, we explain the basic requirements for a project-level environmental impact report, and note some potential pitfalls to avoid when preparing a draft EIR. Please take these requirements to heart when completing the draft EIR for the proposed mine expansion project. This will help the County to make a transparent decision that is based upon facts, science, and the law. Please ensure that impact evaluations and mitigation measures for biological resources conform to Amador County Code, Section 19.50.040.

D) Mitigation Measures and Alternatives

We strongly encourage the County and the applicant to consider mitigation measures and conditions of approval to make this project economically, socially, and environmentally sustainable over the next few decades. For the County's consideration our attachments and exhibits provide samples of permit conditions, mitigation measures and monitoring requirements implemented in other mines in California. (See Attachments E and F, and Exhibits 1 and 2.) **Attachments C, D and I** we provide an alternative for the project applicant to consider and for the County to evaluate in the EIR to reduce potentially significant impacts. We are available to discuss the conditions, mitigation measures, and the alternative with the applicant and the County.

In the past the County has ignored our comments, our proposed mitigation measures, and our project alternatives. This has resulted in litigation. That was the result with the 2016 General Plan and the 2020 Edwin Lands rezone. As you may know, litigation is not uncommon for mining projects throughout California. Instead of repeating old and inefficient habits, we encourage the applicant and the County to work with us to craft acceptable accommodations that can be incorporated into the upcoming project approval.

E) Permit Conditions must protect the health, safety, and well-being.

In addition to CEQA, the County has other legal authority and responsibilities related to the proposed project. The County locally administers the state's Surface Mining and Reclamation Act. Also, the County has Conditional Use Permit authority under the Zoning Code. These laws and regulations both provide the County with the authority, and impose upon the County the affirmative duty, to place conditions on the project when necessary to protect public health, safety, and well-being, and to conserve resources. Such conditions may be necessary even when the EIR finds the impact insignificant. For the County's consideration **Attachment E** is an example of permit conditions implemented at another quarry in California.

F) General Plan Consistency

Finally, as with any discretionary project approval, the proposed project must be consistent with the 2016 General Plan. **Attachment H** identifies questions that must be answered by the County,

with the support of evidence in the record, to make a valid finding that the proposed mine expansion is consistent with the 2016 General Plan. Please consider working with us and the applicant to craft accommodations that could be included in the approval of the project.

Sincerely,



Thomas P. Infusino, for

Foothill Conservancy and FOGI

cc. SGI

Attachment A – CEQA Checklist for SGI Expansion

Attachment B - Basic CEQA Requirements for a Project EIR

Attachment C - Alternative

Attachment D – Fraser West Park Overview

Attachment E: San Rafael Rock Quarry Permit, Mitigation & Monitoring. This provides a good example of mitigating and monitoring impacts from nighttime operations, truck trips, diesel emissions, cultural resources, lake water quality, and dust from high winds.

Attachment F: San Rafael Rock Quarry Mitigation Monitoring Table. This is a good example of a table listing the timing and responsibility for monitoring and reporting on mitigation measure implementation.

Attachment G - Bay Area Air Quality Management District CEQA Air Quality Guidelines.

Attachment H: General Plan Consistency

Attachment I – Colonel Fraser E. West Bio

Attachment J – Material Safety Data Sheet re. Roofing Granules & Silicosis Information

Exhibit I: Pacific Rock Quarry Expansion Project DEIR. This provides examples of evaluating mining impacts associated with aesthetics, agriculture, air quality, biological resources, cultural resources, energy, greenhouse gas emissions, hazards, water and hydrology, land use, soils and minerals, noise and vibration, and transportation.

(https://docs.vcrma.org/images/pdf/planning/ceqa/eir/12-01-2020_LU10-0003_DEIR.pdf)
Exhibit 2: Boca Quarry Expansion Project Recirculated DEIR. This provides examples of evaluating mining impacts related to aesthetics, air quality, biological resources, cultural

resources, energy, greenhouse gas emission, hazards, water and hydrology, minerals and soils, noise, and transportation.

(https://files.ceqanet.opr.ca.gov/72153-3/attachment/NXngCMFnIRJGk2MxYjarjo8_ORR1jNJRzSOOgCxQI9TgN_dYemCt6EqR34_sRTqzjkbYUbxCZKinjjqd0)

Attachment A:
CEQA Environmental Checklist
Prepared by Foothill Conservancy and FOGI

10/5/21

PROJECT DESCRIPTION AND BACKGROUND

Project Title: SGI Mine Expansion

Lead agency name: County of Amador

Project sponsor's name: Specialty Granules (Ione) LLC

Address: 1900 Highway 4, Ione, CA

Phone Number: (301) 393-8410

Project Location: 3 miles west of Ione

General plan description: Mineral Resource (MRZ)

Zoning: Single Family Residential – Agriculture (R1A)

Description of project:

The quarry has operated on the site for 31 years. The proposed expansion would increase the project in space and time. The proposed project would expand the surface area disturbed by the mining (from 155 acres to 290 acres), the depth of mine (from 325 msl down to 280 msl), the area covered by stockpiles (from 36 to 86 acres) and the height of the stockpiles (from 70 feet to 200 feet). It would also extend the operation 100 years (from 2075 to 2175). No increase in the rate of annual production is proposed. To accomplish this expansion requires an amendment to both the Conditional Use Permit and the Reclamation Plan. (The granules plant is operated under a separate CUP and is not part of this project.)

The project is accessed from Highway 104. The current quarry is about 125 feet deep. The current stockpiles are 60-70 feet high. Zoning for the site and surrounding lands is Single Family Residential and Agriculture (R1-A). Surrounding lands are suitable for residences, growing crops, and grazing livestock, and many are so used.

Over the next 154 years, the mine could continue to be operated 24 hours per day, 7 days per week, removing about 158 million tons of overburden topsoil, cap rock, and hard rock. Blasting could continue Monday – Saturday, 9 am-6 pm, up to 80 times per year. The mine would continue to use groundwater. Annual production would be about 600,000 tons of material per year.

When “reclaimed”, the benches and high walls of the quarry will not be revegetated, and the quarry will only partially fill with water up to 105 msl. That is, it will look like a hole

over 250 feet deep with water at the bottom. It will be immediately adjacent to a 200 foot high revegetated stockpile mountain.

Surrounding land uses and setting:

Residential, grazing livestock, growing crops.

NATIVE AMERICAN CONSULTATION

Ensure that consultation and heritage resource confidentiality follow PRC sections 21080.3.1 and 21080.3.2 and California Government Code 65352.4

Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project. Please see the checklist beginning on page 4 for additional information.

- | | |
|--|-------------------------------------|
| X Aesthetics | X Agriculture and Forestry |
| X Air Quality | X Biological Resources |
| X Cultural Resources | X Energy |
| <input type="checkbox"/> Geology/Soils | X Greenhouse Gas Emissions |
| X Hazards and Hazardous Materials | X Hydrology/Water Quality |
| X Land Use/Planning | X Mineral Resources |
| X Noise | X Population/Housing |
| <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| X Transportation | X Tribal Cultural Resources |
| X Utilities/Service Systems | X Wildfire |
| X Mandatory Findings of Significance | |

DETERMINATION

On the basis of this initial evaluation (choose one):

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- X I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Thomas P. Infusino



10/05/21

Print Name

Signature

Date

CEQA Environmental Checklist

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. Where there is a need for clarifying discussion, the discussion is included following the applicable section of the checklist. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

AESTHETICS

Would the project:

Question	CEQA Determination
a) Have a substantial adverse effect on a scenic vista?	Potentially Significant
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	Potentially Significant
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Potentially Significant

a) The presence of an unvegetated overburden pile up to 200 feet high for an additional century may have a significant adverse scenic impact. The pile is constructed from the bottom up. It is unclear why each level of the overburden pile cannot be revegetated when it is complete, while the next level of the pile is being built up.

c) The presence of an unvegetated overburden pile up to 200 feet high for an additional century that is visible from the roadway may have a significant adverse scenic impact.

d) The expanded use of lights across more acreage during night operations may adversely affect views of the area. Please evaluate these impacts in the DEIR.

AGRICULTURE AND FOREST RESOURCES

Would the project:

Question	CEQA Determination
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	Potentially Significant
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	No Impact
d) Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	Potentially Significant

a & e) Dust (even at far lower concentrations than those needed to protect public health) from proposed project for an extra 100 years can harm crops and thereby conflict with agricultural uses on neighboring properties zoned for agricultural. Some of these properties where crops may be harmed may also be under Williamson Act contracts. Please evaluate this potential impact in the DEIR.

In addition, the mining activity may reduce groundwater availability to neighboring agricultural properties. This could be due to the use of groundwater at the mine and/or due to the mine breaking the barrier that sustains the shallow neighboring wells. Please evaluate this potential impact in the DEIR.

AIR QUALITY

Would the project:

Question	CEQA Determination
a) Conflict with or obstruct implementation of the applicable air quality plan?	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	Potentially Significant
c) Expose sensitive receptors to substantial pollutant concentrations?	Potentially Significant
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Potentially Significant

b) Depending upon future conditions, extending the dust, NOx, and hydrocarbon emissions from the mining operation an additional 100 years could substantially contribute to a significant cumulative impact related to a criteria pollutant for which the area's status is non-attainment.

c) There are some neighbors that are currently impacted by significant dust concentrations. The surrounding lands are zoned for single family residential use. It is quite possible that such uses will develop sometime in the next 150 years. This would expose additional receptors to substantial pollutant concentrations.

d) Dust and diesel emissions from the mine contain toxic substances. These can cause adverse health impacts on neighbors. Over the next 150 years, the number of neighbors and mine employees so affected could be substantial. In addition to evaluating potential ambient concentrations of criteria and toxic air pollutants, please complete a health risk assessment.

BIOLOGICAL RESOURCES

Would the project: (Check Study)

Question	CEQA Determination
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries?	Potentially Significant
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	Potentially Significant
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Potentially Significant
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Potentially Significant
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	

a, b, c, & d) See the Biological Resources Assessment (September 2020) supplied by the applicant for an explanation of potentially significant impacts and suggested mitigation measures to reduce those impacts.

CULTURAL RESOURCES

Would the project: (Check Study)

Question	CEQA Determination
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in §15064.5?	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	Potentially Significant
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	Potentially Significant

b) See the Cultural Resources Technical Study (July 2020) submitted by the applicant for an explanation of potentially significant impacts and suggested mitigation measures.

c) The Cultural Resources Technical Study did not include consultation with local tribes. This consultation is needed to determine if there are known grave sites in the project area.

ENERGY

Would the project:

Question	CEQA Determination
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	Potentially Significant
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	

a) Operations 24 hours a day on the expanded site will require extensive lighting. This may be a significant waste of energy.

GEOLOGY AND SOILS

Would the project:

Question	CEQA Determination
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	
ii) Strong seismic ground shaking?	
iii) Seismic-related ground failure, including liquefaction?	
iv) Landslides?	
b) Result in substantial soil erosion or the loss of topsoil?	Potentially Significant
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	Potentially Significant
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	

b) A large area in the mine above the water line (105 msl) but below the regular surface (above 350 msl) will neither be recovered with topsoil nor revegetated. This could be considered a significant loss of topsoil.

e) Existing septic systems will need to be inspected, and soils may need to be tested to determine if they can support septic systems to serve the workforce 24 hours, seven days per week, for another 150 years.

GREENHOUSE GAS EMISSIONS

Would the project:

Question	CEQA Determination
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Potentially Significant
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Potentially Significant

a & b) The project would produce greenhouse gas emissions for an additional century from 2075 to 2175. This may be a significant impact.

HAZARDS AND HAZARDOUS MATERIALS

Would the project:

Question	CEQA Determination
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Potentially Significant
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	No Impact
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	No Impact
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	Potentially Significant

g) The project uses fuel and explosives that could ignite a grass fire only a few miles from the City of Lone. Such windswept fires could rapidly traverse that distance.

HYDROLOGY AND WATER QUALITY

Would the project:

Question	CEQA Determination
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	Potentially Significant
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such the project may impede sustainable groundwater management of the basin?	Potentially Significant
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	Potentially Significant
(i) result in substantial erosion or siltation on- or off-site;	
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	
(iii) 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; or	
(iv) impede or redirect flood flows?	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Potentially Significant

a & e) The reclaimed mine includes a lake/pond at the bottom of the mine with no outlet stream. It is not clear if that lake will meet water quality standards in the water quality control plan. Please evaluate this in the DEIR.

b, c, e) The project uses groundwater in an over-drafted groundwater basin. Continuing this use an additional century may interfere with the pending groundwater basin management plan's ability to maintain equilibrium in the basin. Also, the project may pierce the hydrologic barrier and drain the shallow aquifer. This would reduce the availability of groundwater that makes agriculture possible in the lone Valley. Please evaluate these impacts in the DEIR.

LAND USE AND PLANNING

Would the project:

	CEQA Determination
a) Physically divide an established community?	
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	Potentially Significant
c) Contribute to a land use conflict or nuisance that alters the future physical development of the land or degrades the human environment.	Potentially Significant

b) Attachment G is a list of the provisions of the 2016 General Plan with which the proposed project may conflict. Many are intended to avoid or mitigate an adverse environmental impact. In the DEIR, provide the details regarding the project or its mitigation measures that make the project consistent with one or more of these provisions of the 2016 General Plan. Identify in which ways the project remains in conflict with any of these provisions of the 2016 General Plan.

c) Unincorporated lands between the project and the City of Lone are zoned for residential and agricultural use. Extending the project for another century, with its toxic dust and diesel emissions, could conflict with the allowed neighboring residential uses. This would impeded residential development of these lands, and/or degrade the human environment on those lands.

MINERAL RESOURCES

Would the project:

Question	CEQA Determination
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	
c) Result in the present consumption of a nonrenewable resource rather than conserving some of it for future generations.	Potentially Significant

c) CEQA Guidelines, Section 151276.2 (d) requires an EIR to evaluate irreversible commitments of non-renewable resources. Is current resource consumption is justified, or should some of a resource be conserved for use by future generations? The proposed project would eventually exhaust this mineral resource at one of only 12

places it is found in the country. Please explain in the EIR why this is justified, and why none of the resource should be conserved for the future beyond 2175.

NOISE

Would the project result in:

Question	CEQA Determination
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Potentially Significant
b) Generation of excessive groundborne vibration or groundborne noise levels?	Potentially Significant
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	

a & b) The Environmental Noise and Vibration Study provided by the applicant (July 2020) uses models to forecast insignificant impacts from the project. However, the plant has been in operation for 31 years. Actual noise monitoring results and actual noise observations from residents need to be evaluated to determine the significance of current and future impacts, before extending those impacts for an additional century.

POPULATION AND HOUSING

Would the project:

Question	CEQA Determination
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	No Impact
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	No Impact
c) Alters physical conditions that makes residentially zoned land unsuitable for residential use.	Potentially Significant

c) The lands between the proposed project and the City of Lone are zoned for residential use. The proposed project has the potential to make these lands unsuitable for residential development. It has the potential to reduce groundwater availability for a century beyond 2075. It has the potential to create toxic dust and diesel emissions for a

century beyond 2075. It has the potential to make significant noise and vibrations for a century beyond 2075. In turn, these foreclosed residential uses will need to be accommodated elsewhere. Please evaluate this impact in the DEIR.

PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:

Question	CEQA Determination
a) Fire protection?	
b) Police protection?	
c) Schools?	
d) Parks?	
e) Other public facilities?	Potentially Significant

e) The project’s groundwater use, or its disruption the shallow aquifer, could require the project or other affected groundwater users to seek surface water supplied locally by the Amador Water Agency (AWA). The AWA water supply for the area is already over-committed, and the existing potable water treatment plant is operating at capacity. (See documents already provided to the County in relation to the Edwin Lands Rezone.) In the EIR please identify the alternative water supplies for the area (if any) and the impacts of using those supplies. If there are none, please evaluate the impacts on the human environment associated with additional water shortages for domestic, commercial, industrial, institutional, and agricultural uses. Consider water conservation and recycling options to reduce the impacts.

RECREATION

Question	CEQA Determination
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	

TRANSPORTATION

Would the project:

Question	CEQA Determination
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	Potentially Significant
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	
d) Result in inadequate emergency access?	

a) The project uses a highway that runs through a stop-sign-controlled intersection in downtown lone. Heavy truck traffic for an additional century after 2075 could impede traffic flow and visibility at the intersection.

TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

Question	CEQA Determination
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Potentially Significant

b) The Cultural Resources Technical Study (July 2020) submitted by the applicant identified a site with grinding rocks. However, the Cultural Resources Technical Study did not include consultation with local tribes. This consultation is needed to determine the significance of the resource to the tribe.

UTILITIES AND SERVICE SYSTEMS

Would the project:

Question	CEQA Determination
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	Potentially Significant.
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	Potentially Significant
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	Potentially Significant
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	

a & b) The project's groundwater use, or its disruption the shallow aquifer, could require the project or other affected groundwater users to seek surface water supplied locally by the Amador Water Agency (AWA). The AWA water supply for the area is already over-committed, and the existing potable water treatment plant is operating at capacity. (See documents already provided to the County in relation to the Edwin Lands Rezone.) In the EIR please identify the alternative water supplies for the area (if any) and the impacts of using those supplies. If there are none, please evaluate the impacts on the human environment associated with additional water shortages for domestic, commercial, industrial, institutional, and agricultural uses. Consider water conservation and recycling options to reduce the impacts.

e) Over the next 150 years, the project intends to construct and leave behind a 200 foot high pile of overburden at the mine. That could be considered a significant generation of solid waste.

WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

Question	CEQA Determination
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	Potentially Significant
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	Potentially Significant
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	

b & c) For an additional century, the project would use fuel and explosives that could ignite a grass fire only a few miles from the City of Lone. Such windswept fires could rapidly traverse that distance. This could significantly impact the human environment by destroying the homes and threaten the lives of local residents. To reduce this impact, the County may need to construct a fuel break between the project and the town. The fuel break may have impacts on special status species and visual quality. Limiting project activities during high winds could reduce both the risk of an uncontrollable wildfire, and the harm from dust emissions.

MANDATORY FINDINGS OF SIGNIFICANCE

Question	CEQA Determination
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Yes

Question	CEQA Determination
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	Yes
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Yes

BASIC CEQA REQUIREMENTS FOR A PROJECT EIR

The goal of scoping is to solve “many potential problems that would arise in more serious forms later in the review process.” (CEQA Guidelines, sec. 15083.) To ensure that everyone is clear on the County’s CEQA responsibilities, this document reviews the basic requirements of a project EIR.

We strongly encourage the board of supervisors, county counsel, planning staff, and EIR consultants to review this information. We strongly encourage the County to strictly follow the CEQA Guidelines and case law referenced in this letter in order to promote the purpose of CEQA: to provide the greatest feasible protection of the environment. Developing a good and legally sufficient EIR will help the county avoid a successful challenge of its EIR by any party, saving the taxpayers significant cost. Please note that the legal claims made below are supported by quotations from and citations to the Public Resource Code, the CEQA Guidelines, and to case law; much of it from the California Supreme Court and our own Third District Court of Appeal. We strongly encourage you to ignore consultants who tell you the information we provide here is incorrect without providing some accurate citation to contrary legal authority of equivalent weight. Remember, most of the EIRs found lacking by the courts have been written by such consultants.

Solving problems takes work on all sides. We have done our part by stating our concerns regarding potential problems with the mine expansion proposal, and by presenting possible solutions to those problems. **If you take issue with some of the guidance in these comments, which is intended to ensure full compliance with CEQA, we respectfully ask that you respond to us in writing and/or set up a meeting so that the issues can be resolved.**

We strongly believe that an adequate EIR is essential to informed public participation and decisionmaking. Unfortunately, we have seen other cities and counties try to circumvent the CEQA process, to avoid taking a serious look at alternatives and mitigation measures to protect the human and the natural environment. We urge you not to follow that path.

A. FORMAT AND SUBSTANCE OF AN EIR

1) GENERAL STANDARDS

“[T]he ‘foremost principle’ in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.” (Communities for a Better Environment v. California Resources Agency (2002) 103 Cal.App.4th 98, 110; citing Laurel Heights Improvement Association v. Regents of University of California (1988) 47 Cal.3d 376, 390.) When trying to determine if staff, or consultants, or the Board of Supervisors are proceeding properly with the EIR, the public must ask: Is what they are doing affording

Attachment B - Basic CEQA Requirements for a Project EIR

the fullest possible protection to the environment? If the answer is no, the County should do something else.

While judicial review of CEQA decisions extends only to whether there was a prejudicial abuse of discretion, “an agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence. (§ 21168.5.) Judicial review of these two types of error differs significantly: while we determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA requirements' (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564), we accord greater deference to the agency's substantive factual conclusions." (*Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova*, (2007) 40 Cal.4th 412, 435.)

An EIR should employ “an inter-disciplinary approach that will ensure the integrated use of the natural and social sciences and the consideration of qualitative as well as quantitative factors.” (CEQA Guidelines, sec. 15142.) EIRs should be “analytic rather than encyclopedic.” (CEQA Guidelines, sec. 15006, subd. (o).) “The courts have favored specificity and use of detail in EIRs.” (*Whitman v. Board of Supervisors* (2d Dist. 1979) 88 Cal.App.3d 397, 411 [151 Cal.Rptr. 866].) In *Whitman*, the Court found that the discussion of cumulative impacts lacked “even a minimal degree of specificity or detail” and was “utterly devoid of any reasoned analysis.” The document relied on unquantified and undefined terms such as “increased traffic” and “minor increase in air emissions.”

That means you may have to hire outside help to do technical traffic and air quality studies. That means you need to quantify impacts when impacts can be quantified. You can use qualitative analysis as well, but not as a substitute for otherwise available quantitative analysis. You can't just say traffic will get worse; you have to do the math and show how the conclusion was reached.

EIRs must be “organized and written in a manner that will be meaningful and useful to decisionmakers and to the public.” (Pub. Resources Code, sec. 21003, sub. (b).) EIRs should “emphasize feasible mitigation measures and alternatives to projects.” (Pub. Resources Code, sec. 21003, subd. (c).) At the end of the day, the EIR should have enough detailed information to allow the Board of Supervisors and the public to understand the choices among mitigation measures and alternatives, and to logically advocate for the ones they think best. In the case of a an EIR for a permit with a century long term, we strongly recommend that the alternatives be sufficiently defined, and the analysis be sufficiently detailed, to allow the Board to select any of the alternatives, without further environmental review or project description. We also encourage the County to be prepared to take the best components of each alternative, and to combine them, even if supplemental environmental review would be required. We hope that you will not lose sight of the goal to produce the best project, and to afford the fullest protection to the environment. Anything less is not in the interest of the county's taxpayers.

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“The EIR shall cite all documents used in its preparation including, where possible, the page and section number.” (CEQA Guidelines, sec. 15148.) “A conclusory statement 'unsupported by empirical or experimental data, scientific authorities, or explanatory information of any kind' not only fails to crystallize issues [citation] but 'affords no basis for a comparison of the problems involved with the proposed project and the difficulties involved in the alternatives.'" (People v. County of Kern (5th Dist 1974) 39 Cal.App.3d 830, 841-842 [115 Cal.Rptr. 67], quoting Silva v. Lynn (1st Cir. 1973) 482 F.2d 1282, 1285.) A clearly inadequate or unsupported study will be entitled to no judicial deference. (State Water Resources Control Board Cases (App. 3 Dist. 2006) 136 Cal.App.4th 674.) "Argument, speculation, unsubstantiated opinion, or narrative evidence which is clearly erroneous or inaccurate ... does not constitute substantial evidence." (CEQA Guidelines, sec. 15384.)

Proper citation is an often and needlessly neglected requirement that is of critical importance in an EIR. Without proper citation, an EIR is legally vulnerable and it will be nearly impossible for the County to formulate valid findings of fact.

Ultimately, the board will be required adopt findings of fact supported by substantial evidence in the record. The EIR is the summary of the record. The findings of facts rationally explain the board's findings based upon information in the EIR. When citations to the record back up factual statements in the EIR, which in turn back up the County's well-reasoned ultimate findings of fact, then the record forms tidy chains of facts and reason that support the County's findings. When that chain is broken by unsupported or uncited statements in the EIR, the chains of facts and reason fall apart, and the findings of fact fail to conform to the law. Information scattered in EIR or buried in appendix is not a substitute for good faith reasoned analysis. (California Oak Foundation v. City of Santa Clarita (2005) 133 Cal.App.4th 1219, 1239.)

2) WHAT CONSTITUTES AN ADEQUATE EIR?

As noted above, the EIR should provide a sufficient degree of analysis to allow decisionmakers to make an intelligent judgment. In addition, it must reflect a good faith effort at full disclosure. (CEQA Guidelines, sec. 15151.) "A prejudicial abuse of discretion occurs if the failure to include relevant information precludes informed decisionmaking and informed public participation, thereby thwarting the statutory goals of the EIR process." (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692, 712 [270 Cal.Rptr. 650].) A failure to comply with the law subverts the purposes of CEQA and thus cannot be deemed harmless, if it omits material necessary to informed decision-making and informed public participation. (Planning and Conservation League v. Department of Water Resources (App. 3. Dist. 2000) 83 Cal.App.4th 892).

That means that the EIR must admit the full truth about the proposed general plan, warts and all. If you are wondering whether the EIR is being done right, ask yourself,

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“Are we holding back any information that may reflect badly on the project or one of the alternatives when it comes to adverse impacts or infeasible mitigation? If the answer is yes, then disclose the additional information. CEQA requires full disclosure regardless of how any staff member, consultant, or decisionmaker may feel about the information.

B. CONTENTS OF A DRAFT EIR

1. BRIEF SUMMARY

An EIR must contain a brief summary that identifies the significant effects of the project, the proposed mitigation measures and alternatives, the areas of controversy, and the issues to be resolved. (CEQA Guidelines, sec. 15123.) The most common EIR flaws in this section are the failure to admit the numerous areas of controversy, and the failure to comprehensively list the issues to be resolved. Since an EIR is used and commented upon by distant state and federal agencies, there is an obligation to let these people know the controversies that have arisen, even if they may appear obvious to those who live in the area. Also, the list helps the public and officials to ensure that the stubborn issues do not get swept under the rug. We encourage the Board to use the EIR’s list of controversies as a punch list while reviewing the project’s permit conditions. In this way, the Board can ensure that the permit conditions fairly address each of these critical issues, whether they be environmental, public health, or safety related. Finally, these requirements are directly connected to the standard that the EIR reflect a good faith effort at full disclosure. There is no room for spin or denial in an EIR.

2. PROJECT DESCRIPTION

The project description shall contain the precise location of the project on a detailed map, the objectives of the project, a description of the project's technical, economic, and environmental characteristics, and a statement of the intended uses of the EIR. (CEQA Guidelines, sec. 15124.)

General Plan EIRs usually have no problems identifying the location of the project and providing a map. They often do *not* provide a sufficient project description to allow for proper quantitative analyses of impacts. If the EIR ends up including phrases like, “It would be too speculative to assess this impacts,” then the project description is inadequate.

Project EIRs sometimes neglect to include a comprehensive list of the intended uses of the EIR. This list is needed to reassure the public that the County has properly consulted, during the EIR process, with the many agencies who will use the EIR in the future. It also helps to reassure the public that the County will continue to properly consult with these agencies as they implement their shared jurisdiction over county resources including land, water, highways, emergency response, wildlife, wetlands, and air quality.

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"An accurate, stable, and finite project description is the sine qua non of an informative and legally sufficient EIR." (County of Inyo v. City of Los Angeles (3d Dist. 1977) 71 Cal.App.3d 185, 193, [139 Cal.Rptr. 396].) "A curtailed or distorted project description may stultify the objectives of the reporting process." (Id. at pp. 192-193.) A "curtailed, enigmatic or unstable project description draws a red herring across the path of public input." (Id. at pp. 197-198.) A project description should account for reasonably foreseeable future phases of proposed projects if they may change the scope of the initial project or its environmental impacts. (Laurel Heights Improvement Association of San Francisco v. Regents of the University of California (1988) 47 Cal.3d 376, 393-399 [253 Cal.Rptr. 426].) An accurate and complete project description is necessary to fully evaluate the project's potential environmental impacts. (El Dorado County Taxpayers for Quality Growth v. County of El Dorado (App. 3 Dist. 2004) 122 Cal.App.4th 1591; Center for Sierra Nevada Conservation (App. 3 Dist. 2012) 202 Cal.App.4th 1156, 1171.) A description of the project is an indispensable component of a valid environmental impact report under CEQA. (Western Placer Citizens for an Agricultural and Rural Environment v. County of Placer (App. 3 Dist. 2006) 144 Cal.App.4th 890.)

The tragedy of starting with the wrong project description is that the project description is the foundation from which the rest of the EIR is constructed. When a project description is wrong, the impact analyses are wrong, the alternatives are wrong, the mitigation measures are wrong, and the findings of fact are wrong. There is no recovery from a flawed project description.

3. DESCRIPTION OF THE PROJECT'S ENVIRONMENTAL SETTING

"An EIR must contain an accurate description of the project's environmental setting. An EIR "must include a description of the physical environmental conditions in the vicinity of the project ... from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (Guidelines, § 15125, subd. (a).) There is good reason for this requirement: "Knowledge of the regional setting is critical to the assessment of environmental impacts.... The EIR must demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed and it must permit the significant effects of the project to be considered in the full environmental context." (Guidelines, § 15125, subd. (c).) We interpret this Guideline broadly in order to "afford the fullest possible protection to the environment." (Kings County Farm Bureau, supra, 221 Cal.App.3d 692, 720.) In so doing, we ensure that the EIR's analysis of significant effects, which is generated from this description of the environmental context, is as accurate as possible." (Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 874.) An EIR must describe the physical conditions and environmental resources within the project site and in the project vicinity, and evaluate all potential effects on those physical conditions and resources. (County of Amador v. El Dorado County Water Agency (App. 3 Dist. 1999) 76 Cal.App.4th 931, 952.) "Finally, use of existing conditions as a baseline makes the analysis more accessible to decision makers and especially to members of the public, who

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may be familiar with the existing environment but not technically equipped to assess a projection into the distant future.” (Neighbors for Smart Rail (2013) 57 Cal.4th 439, 455-456.)

Information on the setting may come from a variety of sources. This is why coordination with outside agencies is so important. Air quality data is available from the State Air Resources Board. Wildlife habitat data and fire risk maps are available from state agencies. Water supply information can be gleaned from utility district data.

Setting information in the form of both maps and numerical data is especially useful when the project proposes to expand an existing use. The monitoring of the existing use over the past years of operation should provide accurate baselines for comparison to the proposed expansion.

Among the most relevant aspects of the environmental setting that must be disclosed in an EIR, is that the agency must divulge harm to the environment caused by current and past mismanagement, and any efforts being made to remedy that harm that might affect the proposed project. (Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 874.) So often in the past, EIRs would list the regulatory setting, and then say that the impact will be mitigated by all these outside agencies, so the project impact will be insignificant. Too often however, these outside agencies had track records of failing to effectively mitigate significant impacts, and so should not have been relied upon for impact mitigation. In other instances, the outside agency plans specifically called for active efforts at the local level to mitigate the impact, and so when a local agency did not do so, but merely passed the buck back up to the outside agency, it resulted in a mitigation shell game without any effective on the ground fix. To avoid this in the future, the courts have gotten very strict about both identifying conflicts with other agency plans (as noted below), and about identifying regulatory failures. So for example, a lead agency cannot simply rely on the existing wastewater treatment plant to mitigate future water pollution impacts, if that plant has numerous past permit violations. Also, the past permit violations must be disclosed in the EIR as part of the environmental setting.

Another important use of the environmental setting is in helping the County establish the proper thresholds of significance for impacts. “[T]he significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.” (CEQA Guidelines, sec. 15064, subd. (b).) An EIR can be ruled inadequate when it uses an inappropriate noise threshold for an area or adjacent use. (Los Angeles Unified School Dist. v. City of Los Angeles (1997) 58 Cal.App.4th 1019, 1026.)

The setting section of the DEIR must discuss any inconsistencies between the proposed project and existing general plans and regional plans. (CEQA Guidelines, sec. 15125.) For example, it is ridiculous to try to designate an area for intensive new development if the long-term plans of water supply and transportation agencies show that they cannot fund service to the area. By identifying conflicts among plans in the DEIR, the County can work on ways to eliminate these conflicts.

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"The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." (CEQA Guidelines, sec. 15064, subd. (b).)

4. SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSED PROJECT

The environmental effects that must be considered in an EIR include, direct and indirect effects, short and long-term effects, physical changes in an area, potential health and safety problems, changes in ecological systems, changes in population distribution and concentration, changes in land use, effects on public services, and effects on natural resources including water, scenic beauty, etc. (CEQA Guidelines, sec. 15126.2, subd. (a).)

A common mistake in an EIR for a long term project is the failure to consider short-term significant effects. For example, if the County commits to full impact mitigation, but only after 10 or 20 years, then the EIR must disclose that the impacts will remain significant in the short term, from 10 to 20 years, until the mitigation program is developed. "An EIR stating that in 20 or 30 years the project will improve the environment, but neglecting, without justification, to provide any evaluation of the project's impacts in the meantime, does not 'giv[e] due consideration to both the short-term and long-term effects' of the project (Cal. Code Regs., tit. 14, § 15126.2, subd. (a)) and does not serve CEQA's informational purpose well." (Neighbors for Smart Rail v. Exposition Metro Line Construction Authority (2013) 57 Cal.4th 439.)

Another common mistake is trying to use the term "tiering" as excuses to dodge analyzing critical environmental impact analysis at this time. "[A] decision to 'tier' environmental review does not excuse a governmental entity from complying with CEQA's mandate to prepare, or cause to be prepared, an environmental impact report on any project that may have a significant effect on the environment, with that report to include a detailed statement setting forth '[a]ll significant effects on the environment of the proposed project.' (Pub. Resources Code, § 21100.)" (Stanislaus Natural Heritage Project v. County of Stanislaus (1996) 48 Cal.App.4th 182, 197.)

Another common mistake is to jump to the conclusion that an impact is insignificant. An agency must produce rigorous analysis and concrete substantial evidence to support a determination that the project's impacts are insignificant. (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692 [270 Cal.Rptr. 650].) The appropriate impact analysis process is as follows. The potential impact of the project is compared to a threshold of significance. If the impact is below the threshold, the conclusion is that the impact will be less than significant. If the impact exceeds the threshold, then mitigation measures are identified, and their contribution to reducing the impact is estimated. If there are feasible mitigation measures that can reduce the impact below the threshold of significance, the lead agency **is required to adopt them**, and the conclusion is that the impact is less than significant. If, even after

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adoption of all the feasible mitigation measures the impact still exceeds the threshold, then the conclusion is that the impact is significant and unavoidable.

The common mistake is to skip logical steps in the above analytical process. Often an impact is deemed significant, an agency adopts a short list of mitigation measures, and then jumps to the conclusion that the impact is mitigated. There needs to be an evaluation of the *degree to which* the mitigation measures will reduce the impacts, and a determination of whether the residual impact remains significant. Good examples of this process can be found in the CEQA guides to air quality impact analysis produced by the Sacramento Metropolitan Air Quality Management District (<https://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools>), and by the Bay Area Air Quality Management District (https://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en).

There are also special rules when it comes to evaluating water supply impacts. An EIR is inadequate for not disclosing possible alternative water sources and their impacts. In light of the uncertainty regarding future water supplies, the EIR "cannot simply label the possibility that they will not materialize as 'speculative,' and decline to address it. The County should be informed if other sources exist, and be informed, in at least general terms, of the environmental consequences of tapping such resources." (*Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 373.)

Finally, it is important to remember that it is insufficient to disclose only the primary project impact without correlating it to the ultimate impacts on the human environment. (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184.) Thus, it is not enough for an EIR to show the additional traffic trips on a highway for an entire day. That does not explain how a person's life is affected. The EIR needs to identify the time delay for somebody commuting during peak traffic periods on that road. That explains how the primary project impact affects real people.

5. MITIGATION MEASURES PROPOSED TO MINIMIZE SIGNIFICANT EFFECTS

CEQA requires agencies to adopt feasible mitigation measures in order to substantially lessen or avoid otherwise significant environmental effects. (Pub. Resources Code, secs. 21002, 21081, subd. (CEQA Guidelines, secs. 15002, subd. (a)(3), 15021, subd. (a)(2), 15091, subd. (a)(1).) A mitigation measure is something that avoids an impact, minimizes an impact, reduces the impact over time, restores the impacted environment, or compensates for an impact by providing substitute resources or environments. (CEQA Guidelines, sec. 15370.) The EIR must distinguish between mitigation measures proposed by a project proponent for inclusion in a project and those that, if included as conditions of approval, could reasonably be expected to reduce the level of impacts. (CEQA Guidelines, sec. 15126.4, subd. (a)(1)(A).)

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The biggest mistake made in project EIRs is the random rejection of mitigation measures without a rational reason. (Masonite Corp. v. County of Mendocino (July 26, 2013) 218 Cal.App.4th 230.) A mitigation measure is not infeasible simply because a member of the Planning Commission or the Board of Supervisors does not like it, is prejudiced against environmental protection, or doesn't believe the government should regulate the use of private property. Whether a mitigation measure is proposed by staff, commenting agencies, or members of the public, it cannot be rejected without a reasoned analysis based upon facts in the record. (See CEQA Guidelines, sec. 15088, subd. (c).) We discourage the County from wasting valuable staff time trying to justify the rejection of mitigation measures that have proven effective with other similar projects or in other similar places. We encourage the County to embrace sound solutions to ongoing problems.

When approving projects that are general in nature (e.g. a century of mining), agencies must develop and approve whatever general mitigation measures are feasible, and cannot merely defer the obligation to develop mitigation measures until a specific project is proposed. (Citizens for Quality Growth v. City of Mount Shasta (3 Dist. 1988) 198 Cal.App.3d 433, 442 [243 Cal.Rptr. 727]). In City of Marina, the EIR on campus expansion identified needed mitigation for significant off-site impacts on drainage, water supply, traffic, wastewater management, and fire protection. Certification of EIR without adoption of a feasible mitigation measure was an abuse of discretion under CEQA. Adopting a statement of overriding considerations did not justify certification of the EIR absent adoption of the mitigation measure. (City of Marina v. Board of Trustees (2006) 39 Cal.4th 341.)

a. STANDARDS FOR THE ADEQUACY OF MITIGATION MEASURES

The administrative record must contain substantial evidence supporting the agency's view that the measures will mitigate the impacts. "A clearly inadequate or unsupported study is entitled to no judicial deference." (Laurel Heights Improvement Association of San Francisco v. Regents of the University of California (1988) 47 Cal.3d 376, 422 & 409 fn. 12 [253 Cal.Rptr. 426.]).

A common problem is the philosophical collision between a county's desire to keep mitigation noncommittal, and CEQA's requirement that there be substantial evidence of a commitment to the mitigation. On the one hand, counties are often poorly advised or lobbied to keep the mitigation noncommittal, so that the county cannot be held accountable for mitigation failures. The county then seeks to rely on these noncommittal provisions as part of their impact mitigation program. However, CEQA requires that mitigation measures be enforceable commitments. (Neighbors for Smart Rail (2013) 57 Cal.4th 439, 445.)

One way to resolve these conflicting requirements is the adoption of quantified standards to complement a series of optional measures. For example, the County could list a number of optional mitigation practices to reduce dust impacts. Then the County could commit to applying enough of those measures to ensure that a certain ambient

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particulate level is not exceeded at the property line, where particulate levels will be regularly monitored. In this fashion, the County can provide for flexibility in program development, while still providing clear standards for achievement.

"Because an EIR cannot be meaningfully considered in a vacuum devoid of reality, a project proponent's prior environmental record is properly a subject of close consideration in determining the sufficiency of the proponent's promises in an EIR." "In balancing a proponent's prior shortcomings and its promises for future action, a court should consider relevant factors including: the length, number, and severity of prior environmental errors and the harm caused; whether errors were intentional, negligent, or unavoidable; whether the proponent's environmental record has improved or declined; whether he has attempted in good faith to correct prior problems; and whether the proposed activity will be regulated and monitored by a public entity." (Laurel Heights Improvement Association of San Francisco v. Regents of the University of California (1988) 47 Cal.3d 376, 420 [253 Cal.Rptr. 426.]).

Another common mistake is the unfounded assumption that a mitigation program will fully mitigate an impact. As discussed above, if an agency or a program has a poor track record of mitigating impacts, then its future action cannot be relied upon for impact mitigation. For example, if the Regional Transportation Plan has a many hundred million dollar funding shortfall, it would be wrong to rely on the Regional Transportation Plan to mitigate future traffic congestion impacts. As the courts have noted, "[E]ven where a developer's contribution to roadway improvements is reasonable, a fee program is insufficient mitigation where, even with that contribution, a county will not have sufficient funds to mitigate effects on traffic." (Endangered Habitats League v. County of Orange (2005) 131 Cal.App.4th 777.) We strongly recommend that mitigation measures be evaluated for their economic feasibility. Many consultants will say that this is not required, or that it is outside the scope of an EIR. But CEQA Guidelines, section 15131, subd. (c), requires economic analysis of mitigation measure feasibility.

b. DEFERRAL OF THE FORMULATION OF SPECIFIC MITIGATION STRATEGIES UNTIL AFTER PROJECT APPROVAL

Generally, an agency cannot rely on mitigating a significant impact by developing a mitigation plan *after* project approval. "The CEQA process demands that mitigation measures timely be set forth, that environmental information be complete and relevant, and that environmental decisions be made in an accountable arena." (Oro Fino Gold Mining Corporation v. County of El Dorado (App. 3 Dist. 1990) 225 Cal.App.3d 872, 884-885 [274 Cal.Rptr. 720].) However, this may be permissible if the agency displays a commitment to mitigating the impacts by identifying performance criteria that the measures must satisfy. (Sacramento Old City Association v. City Council of Sacramento (3d Dist. 1991) 229 Cal.App.3d 1011, 1028-1029; Friends of Oroville (App. 3 Dist. 2013) 219 Cal.App.4th 832, 838.)

A common mistake is the improper deferral of impact mitigation. Often a jurisdiction is poorly advised to make no commitments that it can be held accountable for

in the future. That kind of deferral is not allowed by CEQA unless the County commits to achieving specific performance criteria through program implementation.

For example, the county could not rely on a condition like this for mitigation: “Consider adopting a mitigation fee program to offset some of the greenhouse gas emissions from the project.” There is no commitment, and no performance criteria. On the other hand, the County could rely for mitigation measure that said, “Within one year of project approval, the County will develop an mitigation fee program to offset 50% of the GHG emissions from the project.” The latter provision establishes a time-specific commitment and a mitigation standard just as the court approved in Sacramento Old City Association.

Again, it’s critical to note that while CEQA allows flexibility in this fashion, it does *not* allow the County to avoid making specific commitments to mitigate impacts simply because someone may one day hold it accountable.

c. MITIGATION MONITORING AND REPORTING

Prior to project approval, the lead agency must adopt a reporting and monitoring program that is designed to ensure compliance during project implementation. (Pub. Resources Code, sec. 21081.6.) “The purpose of these requirements is to ensure that feasible mitigation measures will actually be implemented as a condition of development, and not merely adopted and then neglected or disregarded.” (Federation of Hillside & Canyon Associations v. City of Los Angeles (2000) 83 Cal.App.4th 1252, 1260 – 1261)

A common myth is that some mitigation measures are self-implementing, and therefore their role as mitigation measures need not appear in the monitoring plan. There is no such thing as self-implementing mitigation measures. This term is generally erroneously applied to measures that actually add additional burdens within existing work assignments. For example, they add new staff responsibilities during project review or new enforcement burdens during inspections. These mitigation measures still need to be in the monitoring and reporting plan and their implementation needs to be assigned to a specific staff, as does the monitoring and reporting on their implementation.

For example, a new “self-implementing” mitigation may call for project proponents to select a list of greenhouse gas mitigation measures to incorporate into their project, to achieve a 50% reduction in greenhouse gas emission. To monitor the policy implementation staff during project review may need to keep a running tab of the selected greenhouse gas mitigation measures adopted by the project. Monitoring mitigation effectiveness may entail appointing building inspectors to see that the mitigation measures selected are actually installed. The inspector may have to report back to planning staff as to whether the condition of approval was complied with. These mitigation monitoring responsibilities need to be spelled out in the monitoring and reporting plan.

6. ALTERNATIVES TO THE PROPOSED ACTION

a. GENERAL PRINCIPLES

An EIR must evaluate a range of reasonable alternatives to the project capable of eliminating any significant adverse environmental effects of the project, or reducing them to a level of insignificance, even though the alternatives may somewhat impede attainment of project objectives, or may be more costly. (Pub. Resources Code, sec. 21002; CEQA Guidelines, sec. 15126, subd. (d); Citizens for Quality Growth v. City of Mount Shasta (3d Dist. 1988) 198 Cal.App.3d 433, 443-445 [243 Cal.Rptr. 727]; In re Bay-Delta (2008) 43 Cal.4th 1143, 1162-1167.)

“An EIR is required to "ensure that all reasonable alternatives to proposed projects are thoroughly assessed by the responsible official." (*Wildlife Alive v. Chickering* (1976) 18 Cal.3d 190, 197 [132 Cal.Rptr. 377, 553 P.2d 537].) Therefore, "[a]n EIR must '[d]escribe a range of reasonable alternatives to the project or to the location of the project, which could feasibly attain the basic objectives of the project and evaluate the comparative merits of the alternatives.' (Guidelines, § 15126, subd. (d).) The discussion must 'focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.' (Guidelines, § 15126, subd. (d)(3).)" (*Kings County Farm Bureau, supra*, 221 Cal.App.3d at p. 733.) This discussion of alternatives must be "meaningful" and must "contain analysis sufficient to allow informed decision making." (*Laurel Heights, supra*, 47 Cal.3d 376, 403-404.)” (Friends of the Eel River v. Sonoma County Water Agency (2003) 108 Cal.App.4th 859, 872-873.)

The lead agency, not the project opponents, has the burden of formulating alternatives for inclusion in an EIR. (Laurel Heights Improvement Association of San Francisco v. Regents of the University of California (1988) 47 Cal.3d 376, 406 [253 Cal.Rptr. 426].) "The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decisionmaking." (CEQA Guidelines, sec. 15126.6 subd. (f).)

The number of alternatives considered is limited by what is reasonably feasible. (Citizens for Open Government (App. 3d Dist. 2012) 205 Cal.App.4th 296, 312-313.) Throughout the development of the range of alternatives, keep asking yourself, “Are we fostering meaningful public participation and informed decisionmaking?” “Are we being unreasonable in eliminating an alternative from consideration?”

One problem that crops up are alternatives insufficiently defined to allow for detailed comparison with the project description.

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Another problem that comes up is the insertion of a poison pill into the alternatives that is not present in the project description. We hope that the County's EIR will be a fair competition of ideas so that the public can have faith in the result.

b. ALTERNATIVES DEEMED INFEASIBLE

An EIR must explain in detail why various alternatives are deemed infeasible. “Without meaningful analysis of alternatives in the EIR, neither the courts nor the public can fulfill their proper roles in the CEQA process. We do not impugn the integrity of the Regents, but neither can we countenance a result that would require blind trust by the public, especially in light of CEQA’s fundamental goal that the public be fully informed as to the environmental consequences of action by their public officials.” (Laurel Heights Improvement Association of San Francisco v. Regents of the University of California (1988) 47 Cal.3d 376, 404 [253 Cal.Rptr. 426].)

The essential ingredient in determining an alternative’s feasibility is the assessment of the alternatives in relation to the objectives of the project. (Planning and Conservation League v. Department of Water Resources (App. 3 Dist. 2000) 83 Cal.App.4th 892.) Thus, it is important not to define the objectives so narrowly as to preclude the consideration of feasible alternatives. (Rural Land Owners Association v. Lodi City Council (3d Dist. 1983) 143 Cal.App.3d 1013, 1025-1026.)

When an alternative is found financially infeasible, some analysis of revenue and cost figures will be needed to support the finding. (Burger v. County of Mendocino (1975) 45 Cal.App.3d 322, 327.) The fact that an alternative project size might be less profitable and produce less tax revenue did not itself render the alternative infeasible, without evidence that the reduced profitability was sufficient to render it impractical to proceed with the project. (Preservation Action Council v. City of San Jose (2006) 121 Cal.App.4th 1490.) “[A]n EIR should not exclude an alternative from detailed consideration merely because it ‘would impede to some degree the attainment of the project objectives.’ (Cal. Code Regs., tit. 14, § 15126.6, subd. (b).)” (In re Bay-Delta (2008) 43 Cal.4th 1143, 1165.)

c. QUANTITATIVE AND COMPARATIVE ANALYSES

CEQA requires a “quantitative, comparative analysis” of the relative environmental impacts and feasibility of project alternatives. (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692, 730-737 [270 Cal.Rptr. 650].) We encourage the County to prepare an EIR that will include quantitative and comparative analyses of the project description and alternatives. That includes running the traffic models, the air quality model, estimating greenhouse gas impacts, calculating water supply impacts, and measuring noise impacts.

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While a matrix of quantified impacts may be a useful way to provide a comparison, the mere ranking of alternatives by presumed but unsubstantiated impacts is not acceptable. This is especially critical when doing an EIR for a long-term project

d. THE IMPORTANCE OF ARTICULATING PROPER PROJECT OBJECTIVES IN FORMULATING A RANGE OF REASONABLE ALTERNATIVES

In the past, lead agencies have attempted to narrow the range of reasonable alternatives by defining the objectives so narrowly that there are no feasible alternatives to the project that meet its objectives. The courts have not allowed this. (Rural Land Owners Association v. Lodi City Council (3d Dist. 1983) 143 Cal.App.3d 1013, 1025-1026 [192 Cal.Rptr. 325].)

FOGI and Foothill Conservancy have proposed an alternative and a suite of mitigation measures. Please work with them and others to develop a feasible alternative for actual consideration by the Planning Commission and the Board of Supervisors. Please do not spend time and money on EIR technical analyses of straw-man alternatives having nobody's support, and no possibility of providing real solutions to real problems. Such a set of straw-man alternatives would fail to "foster meaningful public participation and informed decisionmaking." (CEQA Guidelines, sec. 15126.6 subd. (f).)

e. THE "NO PROJECT ALTERNATIVE"

As suggested above in the environmental setting section, there can be some confusion when it comes to evaluating the "no project" alternative. An EIR must include an analysis of the "no project" alternative. (CEQA Guidelines, sec. 15126.6.) When a project is the revision of an existing project the 'no project' alternative will be the continuation of the existing project. (CEQA Guidelines, sec. 15126.6, subd. (e).) As noted above, the project description and the alternatives must also be compared to the existing baseline environment at the time the NOP was issued.

7. UNAVOIDABLE SIGNIFICANT ENVIRONMENTAL EFFECTS

An EIR must describe any significant impacts that cannot be reduced to a level of insignificance. (CEQA Guidelines, sec. 15126.2, subd. (b).) It is critically important for the EIR to try to express these impacts in quantitative and monetary terms whenever possible. This is because, at the end of the EIR process, the County is going to have to make a finding, based upon substantial evidence in the record, that the benefits of the proposed General Plan outweigh its environmental harm. It is essential that the magnitude of residual impacts be well defined for the County to make a supportable finding. In addition, an easy way to compare otherwise unlike impacts and benefits is to estimate their economic costs and benefits whenever possible.

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For example, if one alternative will result in getting a \$5 million sewage treatment plant for free, that is a \$5 million benefit. On the other hand, if the alternative results in roadway impacts costing \$10 million to fix, that is a \$10 million cost. Thus, rather than struggling to try to balance sewage treatment benefits with traffic congestion impacts, it becomes a simple math exercise to compare the sewage treatment value to the roadway costs. (See, CEQA Guidelines 15141.)

8. SIGNIFICANT IRREVERSIBLE CHANGES

CEQA requires that an EIR for a general plan to identify the significant irreversible environmental changes caused by the project. (CEQA Guidelines, sec. 15126.2, subd. (c).) For this project the impacts are likely to include changes in the topography and the consumption of minerals. , the conversion of agriculture, forest, and mineral lands to other developed uses like residential development. The evaluation in the EIR is used to determine if such current consumption of the resources is justified, or if the resources should be conserved for future use. Please evaluate these impacts in the General Plan Update EIR.

9. GROWTH INDUCING IMPACTS

The EIR must "Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." (CEQA Guidelines, sec. 15126.2, subd. (d).)

Growth inducing impacts can result from a General Plan that sets out land use designations and public works projects that will remove barriers to growth.

For example, "Construction of the road way and utilities cannot be considered in isolation from the development it presages." (City of Antioch v. City Council of Pittsburgh (1st Dist. 1986) 187 Cal.App.3d 1325 [232 Cal.Rptr. 507].) "It is obvious that constructing a large interchange on a major interstate highway in an agricultural area where no connecting road currently exists will have substantial impact on a number of environmental factors." (City of Davis v. Coleman (9th Cir. 1975) 521 F.2d 661, 674-675.)

"It also is settled that the EIR must discuss growth-inducing impacts even though those impacts are not themselves a part of the project under consideration, and even though the extent of the growth is difficult to calculate. The case law supports this distinction. The court in *City of Antioch v. City Council* (1986) 187 Cal.App.3d 1325 [232 Cal.Rptr. 507] found that a project required an EIR notwithstanding that the project itself involved only the construction of a road and sewer project which did not in and of themselves have a significant effect on the environment. The court recognized that the sole reason for the construction was to provide a catalyst for further development in the immediate area. It held that because construction of the project could not easily be undone, and because achievement of its purpose would almost certainly have significant

environmental impacts, the project should not go forward until such impacts were evaluated in the manner prescribed by CEQA. (*Id.* at pp. 1337-1338.)” (Napa Citizens for Honest Government v. Napa County Board of Supervisors (2001) 91 Cal.App.4th 368.)

Growth inducing impacts can result from a project that does not provide for a jobs - housing balance. For example, if the project creates of many low-paying jobs, but there is insufficient affordable housing for the workers, that affordable housing will need to be produced elsewhere. Thus the jobs-housing imbalance is growth inducing. Sometimes EIR preparers try to avoid the requirement to evaluate such growth inducing impacts using the excuse that such future growth is too speculative to evaluate. This excuse has not and will not work. “In *Stanislaus Audubon Society, Inc. v. County of Stanislaus* (1995) 33 Cal.App.4th 144 [39 Cal.Rptr.2d 54], the court considered a proposed construction of a country club and golf course and attendant facilities. It was contended there that an EIR was not required because the growth-inducing impacts of the proposed project were too remote or speculative, and EIRs would be prepared in connection with any application for a housing development. The court responded, "The fact that the exact extent and location of such growth cannot now be determined does not excuse the County from preparation of an EIR.... [R]eview of the likely environmental effects of the proposed country club cannot be postponed until such effects have already manifested themselves through requests for amendment of the general plan and applications for approval of housing developments." (*Id.* at pp. 158-159, fn. omitted.)” (Napa Citizens for Honest Government v. Napa County Board of Supervisors (2001) 91 Cal.App.4th 368-369.)

10. CUMULATIVE IMPACTS

“Cumulative impacts’ refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” (CEQA Guidelines, sec. 15355.) In some cases, a cumulative impact "results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects." (CEQA Guidelines, sec. 15355.) An EIR must discuss significant cumulative impacts, and/or explain why the cumulative impacts are not significant. (CEQA Guidelines, sec. 15130; Citizens to Preserve Ojai v. County of Ventura (2d Dist. 1985) 176 Cal.App.3d 421, 432; Citizens for Open Government (App. 3d Dist. 2012) 205 Cal.App.4th 296, 320.)

a. THRESHHOLDS OF SIGNIFICANCE

Problems often arise in evaluating the significance of cumulative impacts.

In many cases, the existing environmental conditions (e.g. air quality, traffic congestion, etc.) may already be cumulatively significantly impacted, even without the project. At times, consultants have argued that in such situations, additional cumulative impacts should not be considered significant. The courts have disagreed. In fact, the courts have concluded the opposite. Namely, the more severe the existing environmental

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problems are, the lower the threshold for treating the project's cumulative impacts as significant. (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692, 718-721 [270 Cal.Rptr. 650].) The relevant question is whether any additional amount of effect should be considered significant in the context of the existing cumulative effect. (Communities for a Better Environment v. California Resources Agency (App. 3 Dist. 2002) 103 Cal.App.4th 98; Mount Shasta Bioregional Ecology Center (App. 3 Dist. 2012) 210 Cal.App.4th 184, 210-211.)

Another suspect approach is choosing thresholds that are so ridiculously large that the project's cumulative impacts are incorrectly judged insignificant. For example, too often EIRs of late have identified tons of project-related greenhouse gas emission, and then said that the impact is insignificant because the threshold is the entire state's production of GHGs. For the reasons noted above, this logic is flawed and the analysis is not compliant with CEQA. The County should avoid trying to minimize significant impacts by using ridiculously large thresholds.

b. SCOPE

The California Supreme Court has ruled that lead agencies have an obligation under CEQA to consider geographically distant environmental impacts of their activities. (Muzzy Ranch (2007) 41 Cal.4th 372, 377-388) The lead agency must justify its choice of scope for each cumulative impact analysis. (CEQA Guidelines, sec. 15130, subd. (b)(3).) The scope will be different for different impacts, because different cumulative impacts affect different geographic areas. For example, the cumulative air quality impact analyses of major projects should consider the cumulative impacts over the entire air basin. (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692, 721-724.) Similarly, cumulative traffic congestion impacts on inter-county highways will be felt across the county line, and the analysis should not stop at the county border. Cumulative impacts on localized wildlife populations may only come from local projects, while cumulative impacts on migratory wildlife may accrue from throughout their migratory range.

c. DETAILED ANALYSIS

Quantitative data is often needed in cumulative impact analyses. "Absent some data indicating the volume of ground water used by all such projects, it is impossible to evaluate whether the impacts associated with their use of ground water are significant and whether such impacts will indeed be mitigated by the water conservation efforts upon which the EIR relies." (Kings County Farm Bureau et al. v. City of Hanford (5th Dist. 1990) 221 Cal.App.3d 692, 728-729 [270 Cal.Rptr. 650].) Where a "sophisticated technical analysis" is "not feasible" the lead agency is still bound to conduct "some reasonable, albeit less exacting, analysis." Citizens to Preserve Ojai v. County of Ventura (2d Dist. 1985) 176 Cal.App.3d 421, 432 [222 Cal.Rptr. 247]

d. MITIGATING THE IMPACTS OF INCREMENTAL DEVELOPMENT

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“Assessment of a project's cumulative impact on the environment is a critical aspect of the EIR. [3] 'One of the most important environmental lessons evident from past experience is that environmental damage often occurs incrementally from a variety of small sources. These sources appear insignificant, assuming threatening dimensions only when considered in light of the other sources with which they interact.' " (Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692, 720 [270 Cal.Rptr. 650], quoting Selmi, *The Judicial Development of the California Environmental Quality Act* (1984) 18 U.C. Davis L.Rev. 197, 244, fn. omitted.)” (Los Angeles Unified School Dist. v. City of Los Angeles (1997) 58 Cal.App.4th 1019, 1025 – 1026.) This statement refers to the phenomenon sometimes referred to as “death by 1,000 cuts.”

Attachment C: The Alternative:

We expect that the permit extension will include all environmental mitigation and permit conditions possible by implementing dust control, limited hours, night light avoidance, noise abatement, restricted water, operations and truck traffic, reclamation of prior untouched tailings and refuse, sensitivity to archeological artifacts and history, prevention of groundwater runoff, and respecting local water vital to the area.

Having said that, mining creates greenhouse gases and dust containing particulate matter detrimental to the Earth in general and local Public Health specifically, meaning all that live, work, and reside in Ione and the surrounding areas will be affected.

Mining is responsible for 4% to 7% of global greenhouse gas emissions in terms of the sector's Scope 1 and Scope 2 emissions, according to January estimates from McKinsey & Co. Including Scope 3 emissions links the sector to around 28% of global emissions. Scope 1 covers direct emissions from operations. Scope 2 covers indirect emissions from power generation, and Scope 3 covers all other indirect emissions. Half of the global industrial greenhouse gas emissions in 2015 were traced to just 50 companies including 20 mining companies, according to a report from the Carbon Disclosure Project.”

<https://www.spglobal.com/platts/en/market-insights/latest-news/coal/072720-mining-faces-pressure-for-net-zero-targets-as-demand-rises-for-clean-energy-raw-materials>

“To address climate risk, mining companies can focus on three areas: which assets are most at risk from physical climate change; how decarbonization could shift demand for key minerals; and how miners can decarbonize their own operations.”

<https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-decarbonization-what-every-mining-ceo-needs-to-know>

Therefore, we expect that in addition to environmental mitigation, SGI would focus on 1) decarbonization of their operations, 2) developing carbon offsets, and 3) most importantly, giving back to the Community as a way of saying Industry can exist side by side with ranching, farming and living in the Ione Valley.

“The mining industry is familiar with the potential for community grievances to spill over into unrest, and that’s particularly true for matters related to ESG. As a result, many industry players are already preparing for potential litigation. In an increasingly divisive geopolitical environment, the risk of climate terrorism is also on the rise, opening the door to attacks, both physical and cyber.

Conversely, as companies consider abatement options, they can design in cobenefits for the communities in which they operate in order to lower emissions and build community support. For example, as companies establish carbon trading and offsetting strategies, including local nature-based solutions with the ecosystem and other local benefits, they could deliver good outcomes for all stakeholders.”

<https://www2.deloitte.com/us/en/insights/industry/mining-and-metals/tracking-the-trends/2021/decarbonization-mining-and-climate-change.html>

Public Park

In summary, to offset SGI’s unmitigable damages to the environment, the citizens of Ione and surrounding areas, we proposed that SGI create a Public Park, to conserve and protect pristine areas

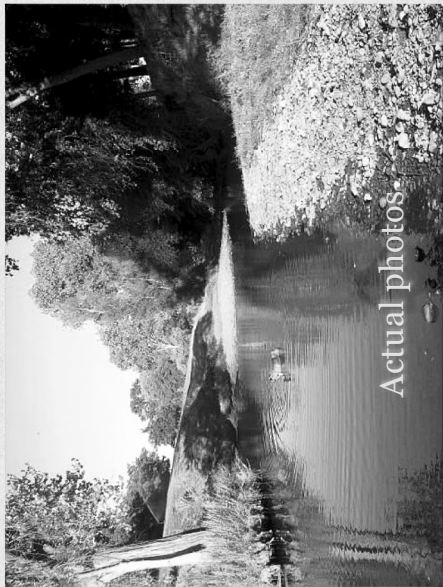
adjacent to SGI's operations, to provide low elevation hiking, access and protection of nature and rare and endangered species, protect the local waterways while preserving the local foothills. The area most logical and desirable for this park is exactly south and east of SGI, a ridge with spectacular views of the Ione Valley and Sierras, comprised of 278 pristine acres owned by SGI's partner and customer Vulcan Materials. We would also like to include seasonal fishing and family outings at the Rancheria owned Loch Lane Lake.

SGI could work with local and National Conservation entities such as the Foothill Conservancy and the Nature Conservancy, all of whom have expressed deep interest in conserving this area. The Park would preserve and utilize natural environments to benefit all, show how alternatives to this project would increase real jobs in the County faster, and create new tourism and revenue in Ione

We also propose that naming this public park after a beloved local Ione hero Col. Fraser West, (USMC Retired), which would capture generations of local good will, establish conservation, and appreciation for how nature, ranching, farming, and residing work together in the Ione Valley.

We propose that if the current permit request is granted for 125 years, the conservation effort would be at least the same. When this project is developed and approved, SGI might develop and keep friends in the Community instead of beleaguered enemies poised to fight and sue at every step of the way.

FRASER WEST PARK



Actual photos.



A sacred trust



THE THREAT

286 pristine acres are at risk from mining development proposals proposals

THE OPPORTUNITY

Fraser West Park offers the people a rare opportunity to protect and preserve their heritage – the land – by creating a new 286 acre preserve.

- Creates vast new recreational opportunities in the low Sierras
- Preserves pristine habitat for dozens of threatened and endangered species
- Saves seasonal wetlands for thousands of migratory birds
- Produces much needed green jobs and stimulates the local economy
- Builds on the historic California tradition of wise conservation



FRASER WEST PARK TRUST

- *Could be a non-profit focused on conservation and education*
- *Powerful political leverage through strategic partnerships with leading conservation groups*
- *Long term goal of establishing a preservation and educational foundation to serve as an ongoing organizational model*



TRANSFORMATION



Fraser West Park embodies the powerfully transformative American experience of a spiritual reconnection to the land

EXHIBIT 2

Marin County Surface Mining and Quarrying Permit Permit # Q-72-03, Amendment #1 Conditions of Approval Including Amended Reclamation Plan San Rafael Rock Quarry (CA Mine #91-21-0008)

This Permit is issued pursuant to Marin County Code Section 23.06. This Permit is intended to regulate the control of surface mining and quarrying operations and to insure that all lands affected by such operations shall be reclaimed according to the State Surface Mining and Reclamation Act (SMARA) and local ordinances.

Project Location

San Rafael Rock Quarry
1000 Point San Pedro Road
San Rafael, CA

Assessor Parcel Numbers (dry land in **bold**):

184-010-**09**, **-15**, **-16** -18, -19, -20, -44, -45, -47, -51, and **-52**

Dry land covers approximately 272 acres.

General Plan Designations: City-Center Corridor; Bayfront Corridor, Mineral Resource Area

Zoning: RMPC (Residential/Commercial Multiple Planned)

Definitions

“Permittee” means any person, partnership, corporation or public agency engaged in surface mining or quarrying and shall be defined as both the owner of the property, and the operator of the facility. All references herein to “Permittee” shall be defined to include the “permittee, or successor(s) in interest”.

“Operation” means all of the premises, facilities, roads and equipment used in the process of producing the mining or quarrying products, from the designed strip mine or quarry area or removing the overburden for the purpose of determining the location, quality or quantity of a natural deposit.

“Overburden” means all the earth and other materials, consolidated or unconsolidated, which lie above a natural deposit of mineral or useful rock, and shall also mean such earth and other material after removal from their natural state in the process of surface mining.

“(Northeast, Northwest, Southeast, Southwest) Quadrants” means the geographic division of the Quarry property as labeled and shown in Figure 1 of the 1982 Amended Reclamation Plan.

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

Permit Format

Where Permit conditions of approval are derived from an Environmental Impact Report mitigation measure, the particular mitigation measure or measures are identified by parentheses and italics.

Quarry Plan Submittals

Except as amended by this Permit and these Conditions of Approval the Amended Reclamation Plan is comprised of:

- San Rafael Rock Quarry Amended Reclamation Plan 2004 (Volume 1) dated October 12, 2004 (three ring binder)
- San Rafael Rock Quarry Amended Reclamation Plan 2004 (Volume 2 - Appendices) dated October 12, 2004 (three ring binder)
- San Rafael Rock Quarry Amended Reclamation Plan 2004 Implementation Plan sheets containing sheets E1 thru E6, G1 thru G4, RV1 thru RV4, and CS1 thru CS5 (Size D sheets), dated ‘Revised 2004’,
- Supplemental Amended Reclamation Plan information letter dated December 14, 2004 from CSW/Stuber-Stroeh Engineering Group, Inc. including ledger size drawings revising Sheets E2, E3, E5, and RV1 thru RV4
- Supplemental Geotechnical Data Report by ENGEQ, Inc. dated April 11, 2005
- Supplemental Information for Section 2.B.5.i – Maintenance, San Rafael Rock Quarry, Amended Reclamation Plan 2004 (October 12, 2004), Revised on March 24, 2005

General Quarry Operations

1. This Permit is granted for the surface mining and quarrying operations, and reclamation activities, consisting of the following:

- a. Mining and excavation, including removal of overburden, in accordance with the approved reclamation plan.

- b. On site processing of aggregate materials obtained from on site including, rock crushing, sorting, screening, conveying and storage/stockpiling.
 - c. Barge loading operations for materials obtained on site including conveyor and direct truck loading of barges, and barge unloading of dredged San Francisco Bay sand from barges for asphalt production.
 - d. The operation of an asphalt concrete batch plant using on-site aggregate materials and production of asphaltic concrete.
 - e. Access to and from the site by truck, and the loading of commercial and inter-facility trucks on site with rock, asphalt and processed aggregate materials quarried from the site.
 - f. Maintenance activities including repair, replacement and failure preventative measures on facilities, fixed plant, vehicles, vessels, and stationary and mobile equipment operating at the site.
 - g. Structures, facilities, equipment and other accessory uses and appurtenances including, but not limited to rock crushers, conveyor belts, asphalt batch plant, barging facilities, water supply ponds, water recycling ponds, scale house, truck wash racks, above ground fuel tanks, air pollution control equipment, administration offices, maintenance buildings and sheds as shown in the 2006 existing conditions aerial topography and map dated December 19, 2006, on record at the Marin County Department of Public Works. This is the last County required aerial map submittal prior to publishing the Notice of Preparation for the amended quarry permit EIR.
 - h. Reclamation, revegetation, reclamation monitoring, and biological studies at the quarry site per the approved reclamation plan and this Permit.
2. Mining shall not occur in the Northwest Quadrant. Mining shall not occur in the Northeast Quadrant except to the extent that rock is encountered when establishing the Quarry Bowl bench at the edge of the future flooded San Francisco Bay inlet. In no event shall mining occur beyond 100 feet north of the boundary line between the Northeast Quadrant and the Southeast Quadrant. Mining shall not occur on the non-land (on the bay side of the San Francisco Bay shoreline) portions of the Quarry lands. Quarrying on South Hill shall not be beyond what was described in the 1982 Amended Reclamation Plan.
3. The Permittee shall not import onto the Quarry property gravel, used asphalt concrete or concrete for recycling, or dredged non-sand material.
4. Pond fines, if produced in the future, shall not be placed in the Northeast or Northwest Quadrants.

5. Maximum annual production shall be limited to the fluctuating 1982 baseline level of production, i.e., a 5-year rolling average of no more than 1,414,667 tons per calendar year, and a maximum level of production of 1,697,600 tons in any one calendar year. (*Mitigation Measures P4.2-6c, P4.2-7d, C4.2-9b & P4.6-6b*)

a. Applicant shall keep a weekly operations production log, to the satisfaction of the Director of Public Works, which shall include the amount of product produced from all operations, the amount of product kept on-site, the amount of product removed from the Quarry site by barge and the amount of product removed from the Quarry site by truck. The log shall remain at the project site and be made available within 24 hours of a written request for such log from the Director of Public Works.

6. No equipment changes or other modifications to the plant, including but not limited to all crushers, screens and conveyors, shall be effected so as to increase plant capacity above existing conditions or limits set forth in BAAQMD permits at time of Permit issuance without Permittee obtaining County approval first. The Permittee shall not undertake operational or construction related activity which is not explicitly described in these conditions or applicable Exhibits without first contacting the Public Works Director to determine if said activity requires a modification or amendment to the Permit. A written description and/or map may be required by the Public Works Director prior to rendering a decision.

7. All Quarry operations and reclamation activity shall comply with the applicable Combined EIR mitigation measures.

8. This permit shall be kept on the site and must be shown to any representative of the Department of Public Works or any law enforcement officer on request.

General Reclamation Plan

9. As a condition to this Permit, and as further described below regarding a Conforming Amended Reclamation Plan, Permittee shall revise the 2004 Amended Reclamation Plan submittal to incorporate the following:

a. Add the same lands shown in the 1982 Amended Reclamation Plan, Figure 4, in the Northwest Quadrant labeled as 'preserve in natural state' (southerly and adjacent to kiln) as lands to be preserved in the 2004 Amended Reclamation Plan.

b. The toe of the 'surcharge berm' shown in the Northwest Quadrant of the 2004 Amended Reclamation Plan shall be no closer than 100 feet from the edge of the marsh area (edge of wetland delineation).

c. The 'surcharge berm' shown in the Northwest Quadrant shall be no higher than elevation 25 feet. McNear's Brickyard material storage or use

cannot occur on top of the surcharge berm above a surcharge berm grade of elevation 15 feet.

d. Phase 1 Reclamation plans shall be revised to: 1) provide an option to remove the new berm construction in the Northeast Quadrant (“Northeast Berm 1”), 2) not begin reclamation grading activity, except for erosion and sediment control, in the Northeast Quadrant for the first 18 months following approval of the Permit and amended reclamation plan, 3) relocate the top soil stockpile fill area “F” under Phase 1 of the proposed project, to avoid potentially adverse effects to the Caretaker’s Residence, and 4) schedule marsh restoration for the first phase of reclamation work, but after the marsh restoration plan has been completed, approved and necessary permits obtained from resource agencies. Sheet G1 of the 2004 Amended Reclamation Plan shall be revised to reflect changes and to provide two sets of plans, one with and one without the “Northeast Berm1”.

e. Phase 2 Reclamation plans shall be revised the Northwest quadrant surcharge berm maximum elevation to no greater than elevation 25 feet. Sheet G2 of the 2004 Amended Reclamation Plan shall be revised to reflect changes.

f. In order to preserve visual and sound screening between the mining and plant operations and adjacent residences, reclamation plans shall be revised so that the northern and easternmost hill/berm adjacent to the quarry bowl are maintained as a barrier until the later stage of reclamation or the last 5 years of the current approved amended reclamation plan. Sheets G1 through G4 of the 2004 Amended Reclamation Plan shall be revised to reflect changes.

g. Phase 4 Reclamation plans shall be revised to complete South Hill mining during this phase. Plans shall show amount of overburden or topsoil proposed as cover over final bedrock surface elevation. The Phase 1 Reclamation options in these conditions shall be reflected in two sets of Phase 4 plans. Final contour elevations shall be clearly labeled. Final South Hill contours shall be approximately no lower than those in the 1982 Amended Reclamation Plan. Provide at least two north-south cross sections across the quarry bowl and one cross section across the marsh/brickyard area, starting from the edge of property near Point San Pedro Road across the quarry to the Bay shoreline. Provide at least one east-west cross section through the quarry bowl and surcharge berm area. Show geologic conditions along the same cross sections. Indicate amount of backfill over rock on South Hill. Sheet G4 of the 2004 Amended Reclamation Plan shall be revised to reflect changes.

h. All Northeast Quadrant grading activities are limited to work and activities needed for geotechnical soil stabilization, erosion control and

successful revegetation of the area as approved by the Public Works Director. Grading activity that furthers the development beyond what is needed to readily adapt the area for alternative land uses is not approved under this Permit.

i. The four phase reclamation plan timeline shall be modified so that the ending date corresponds to the end of the Combined EIR analysis period date.

j. The erosion control and revegetation sheets shall be revised as needed to conform to the changes in this condition.

10. South Hill mining and quarrying shall be limited to no more than 75% of annual production for the first, second and third full calendar year, 50% of production the fourth year and 25% of production the fifth year after Permit approval; and thereafter a maximum of 141,467 tons per year, each year, until the quarry bowl depth shown in the 2004 Amended Reclamation Plan is reached or until year 2022. Excepting from this condition is the year that construction of the new ramp/road into the quarry bowl intersects with the existing ramp/road, in which case South Hill production shall not exceed 75% annual production for that single year. There are no South Hill annual production limits once the proposed bowl depth is reached or after calendar year 2022. The first three years of South Hill production reductions may be exchanged subject to prior approval by the Public Works Director. Annual production is defined as the rock/aggregate production provided to the State Office of Mine Reclamation annual operations report (excepting overburden sold as a result of a public emergency).

a. Materials shall be tested to ensure that they do not exceed hazardous waste standards prior to disposing excess overburden, pond fines or other mining wastes from other areas of the property in the Quarry Bowl.

b. The South Hill and Quarry Bowl production shall be provided in the Annual report to the County.

11. *Greenhouse Gas (GHG)* - The Permittee shall revise the amended reclamation plan, and include in the Conforming Amended Reclamation Plan described below, to add the following submittal requirement in the future post-reclamation development plan (*Mitigation Measure R4.2-5*):

a. A detail inventory of Greenhouse Gas (GHG) emissions associated with post-reclamation development, and

b. How the post reclamation development will incorporate measures to reduce GHG emissions consistent with Countywide (General) Plan policies and other relevant and applicable County, state and federal standards, in effect at the time of the Development Plan submittal.

12. Within 60 days of Permit approval, Permittee shall submit a statement of impact of reclamation on the future mining pursuant to Public Resource Code (PRC) Section 2772(c)(9).

13. Within 60 days of Permit approval, Permittee shall, to the satisfaction of the State Office of Mine Reclamation (OMR), revise the amended reclamation plan to give due consideration of the degree and type of present and probable future exposure of the public to the site (CCR Title 14, Section 3502(b)(2)).

14. Within 60 days of Permit approval, Permittee shall revise the amended reclamation plan to incorporate the State Office of Mine Reclamation (OMR) "Resoiling and Revegetation" comments contained in OMR's December 14, 2009 comment letter to the County.

15. *Conforming Amended Reclamation Plan:* Within 60 days of Permit approval, the Permittee shall submit a conforming reclamation plan incorporating these condition and approvals granted to the Permittee. The Public Works Director shall review the plan for conformance with all aspects of the County's approval. The Public Works Director may return the plan to the Permittee to correct any deficiencies, as determined by the Public Works Director at his sole direction. Thereafter, the Permittee shall have 30 days to resubmit the reclamation plan incorporating the comments and requested changes.

16. *Submittal of Financial Assurances Cost Estimate:* Within 60 days of Permit approval, Permittee shall submit a revised financial assurance (FA) cost estimate in conformance with the requirements of Surface Mining and Reclamation Act (SMARA) and, including but not limited to:

- a. A preliminary cost estimate to provide continuous funding of the operations and maintenance of the deep water quality equipment of the future harbor shall be included in the FA cost estimate.
- b. The FA cost estimate shall be amended at the time that the deep water quality engineering and economic report is completed and accepted by the County.
- c. Shall include all phases of reclamation over the entire Quarry property.

17. *Submittal of Financial Assurances:* The Permittee shall guarantee timely performance of reclamation requirements of the Marin County Surface Mining Ordinance and these conditions of approval by providing a mechanism for financial assurance of reclamation as described in, and in accordance with, the Surface Mining and Reclamation Act (SMARA) and the Marin County Surface Mining Ordinance. The mechanism shall be of sufficient value to cover the full costs of reclamation in any specific year for which it is calculated, and may take any form acceptable as determined by the County within the requirements of SMARA.

18. Financial assurance shall renew automatically and shall not expire or be terminated without 90-days advance written notice being provided to the County Department of Public Works. Marin County may adjust the amount of the security on an annual basis to account for additional lands disturbed or reclaimed, inflation, or revised cost estimates. The financial assurance shall reference the name of the mining site, and the County permit number.

19. The County may pursue redemption of the FA securities if: 1) the final reclamation does not meet the performance standards, 2) satisfactory progress is not made towards completing the reclamation in a timely manner, or 3) the operator is financially incapable of carrying out the reclamation

20. *Acceptance of Responsibility:* Within 60 days of Permit approval, the Permittee shall provide a written statement from the person submitting the conforming reclamation plan that they accept responsibility for reclaiming the mined lands in accordance with the reclamation plan.

21. *Grading Permit:* For each phase of reclamation, Permittee shall submit an application for Excavation, Grading or Filling, with plans, to the Department of Public Works prior to each phase of reclamation and which will be subject to review and approval by the Director of Public Works.

a. Reclamation grading shall be limited to a 10 week work period in any one calendar year. A reclamation phase may occur over multiple years.

b. Permittee shall submit the application at least 120 days in advance of the anticipated start of grading.

c. The Permittee shall provide a geotechnical evaluation and report on the pond fine to soil mixing ratio needed to comply with the California Surface Mining and Reclamation Act (SMARA) reclamation performance standards. Further, the geotechnical evaluation shall also examine the most efficient method and location to reclaim the pond fines which further reduces potential impacts to the environment and minimizes the amount of material imported into the NE Quadrant. The evaluation is subject to the Public Works Director's review and approval. The Permittee shall also fund an independent geotechnical review and site assessment (peer review) by the County on the submitted report.

22. *Interim Management Plan (Idle Mine):* In the event that the permitted operation is curtailed for a period of one year or more, by more than 90% of the operation's previous maximum annual mineral production, with the intent to resume those surface mining operations at future date, the Permittee shall file and implement an interim management plan in accordance with the provisions of SMARA.

23. All other parts of the reclamation plan are to be completed concurrently with the grading or as soon as practicable after completion of the grading specified in the reclamation plan (MCC 23.60.050 (6)).

24. Within ninety (90) days of termination of actual rock or mineral production, all structures, metal, lumber, tanks, or other debris or materials resulting from the operation are to be removed (MCC 23.06.050).

Specific Reclamation Limitations on Mining Area, Depth and Slopes

25. Mining, excavation and reclamation shall only occur as specified in the approved reclamation plan (Conforming Amended Reclamation Plan and any subsequent approved amendments). Nothing in the Permit conditions contained herein allows the Permittee to excavate beyond or below approved excavation contours.

26. All final slopes on approved reclamation plan shall meet the following criteria, unless subsequent geotechnical analysis indicate modifications are required to maintain slope integrity:

a. Within the quarry pit, the average (toe to top) slope inclination shall not exceed 60 degrees for a maximum vertical height of 350 feet, as depicted on Figure 15 of the ENGEO Supplemental Geotechnical Data Report, Proposed Changes to Mining Plan, San Rafael Rock Quarry, Marin County California, April 11, 2005 (ENGEO Supplemental Report).

b. Minimum 30-foot-wide safety benches shall be constructed at a maximum of 90-foot vertical intervals.

c. In general, the inclination of inter-bench faces should be maintained at less than 75 degrees where possible. The recommended safety bench spacing and width are depicted in ENGEO Supplemental Report Figure 15. Locally, inter-bench face inclinations will be influenced by splitting along pre-existing rock discontinuities, but overhanging faces should be avoided whenever possible.

27. No stockpiling or related reclamation or mining activity shall occur within 100 feet of the marsh areas (as defined by Biological Recommendations Under the Amended Reclamation Plan of 2004 for the San Rafael Rock Quarry, LSA, October 8, 2004, Potentially Jurisdictional Wetlands and Other Waters, Figure 2, or other subsequent and resource agency approved study/determination), or within 50 feet of the outer property boundary in the NE Quadrant, except where pond fines are found in the NE Quadrant at the time the Permit is issued.

Expiration of Permit Upon Conclusion of Complete Reclamation

28. This Permit shall expire when reclamation is complete. "Complete" reclamation is defined as that point in time when all mining has ceased, the

requirements of the approved reclamation plan have been met, including revegetation maintenance and monitoring, long term financial arrangements for harbor water quality maintenance are established, and the final financial assurance required by SMARA is returned to the Permittee.

29. All conditions of this Permit shall remain in effect until the Reclamation Plan is deemed “complete” by the County or the State, even though the operational aspects of mining have been terminated. A valid financial assurance (FA) shall be maintained on file until the County determines that all reclamation has been successfully carried out in compliance with the reclamation plan and Permit conditions.

30. The San Rafael Rock Quarry Combined EIR certified on October 27, 2009, analyzed potential impacts and the environment through year 2024. The term of the amended reclamation plan approval will be through December 31, 2024.

a. This permit may continue to be valid beyond 2024 insofar as quarrying and mining operations have ceased, and final Phase 4 reclamation is in progress per the approved reclamation plan and is substantially complete. Such activities may include vegetation management, marsh management, erosion and sediment control, historic structure preservation, and harbor and water quality management. However, continued quarry operations beyond 2024 would be considered a substantial extension of the termination date of mining operations as set out in the approved reclamation plan. In order for quarry operations, including but not limited to, crushing, trucking product, asphalt plant operation and barging, to continue beyond 2024, an application to amend the reclamation plan termination date, including continued mining operations if so desired, shall be filed at least 3 years before the termination date of the amended reclamation plan (no later than December 31, 2021).

31. Three years prior to the end of quarrying operations, Permittee shall submit a development plan for subsequent use of the quarry property.

a. Neither approval of this permit nor approval of the amended reclamation plan constitute approval of post reclamation land uses, regardless of the generalized land uses depicted in submittals, reclamation plans or the Combined FEIR. Pursuant to the Surface Mining and Reclamation Act (SMARA), the purpose of a reclamation plan is to assure that adverse environmental effects are prevented or minimize and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses. The proposed mix of land uses and intensities shall be reviewed and considered by the appropriate jurisdiction in the future, at the time a development plan is filed by the property owner as part of the required land use and environmental review entitlements process.

Days and Hours of Operations & Reclamation

32. Except for declared public emergencies, as described below, site quarry operations or reclamation shall exclude Sundays and State Holidays, and the hours of operations for quarry and reclamation operations shall be limited to:

Activity	Days of Week	Hours of Operations
Mining, Quarrying, Excavation, Drilling, Crushing Plant, Primary Crusher, Secondary Crusher, Aggregate Processing and Handling, and Asphalt Batch Plant	Mon. – Fri.	7 a.m. to 8 p.m.
Maintenance Activities (excluding maintenance activity with no off site noise at nearby residences)	Mon. – Fri.	Same as above (Mining, etc.)
	Sat.	Up to 10 Sat. per cal. yr. 7 a.m. to 5 p.m.
Reclamation Grading Activity in the N.E., N.W. and S.W. Quadrants	Mon. - Fri.	<i>Apr. 15 thru Oct. 15 only, up to 10 weeks</i> 7 a.m. to 5 p.m.
Material Haul Trucks Entering or Departing Quarry	Mon. – Fri.	7 a.m. to 5 p.m.
Barge Loading (truck or conveyor) Operations 'Winter', Nov.1 thru Mar. 31 ²	Mon. – Thu.	7 a.m. to 10 p.m.
	Fri.	7 a.m. to 7 p.m. Up to 26 Fri. per cal. yr. ² 7 a.m. to 10 p.m.
	Sat.	Up to 26 Sat. per cal. yr. ² , 7 a.m. to 10 p.m. only when combined with Friday work until 10 p.m.
Barge Loading (truck or conveyor) Operations 'Summer', Apr. 1 thru Oct. 31 ²	Mon. – Thu.	7 a.m. to 9 p.m. ¹
	Fri.	7 a.m. to 7 p.m. Up to 26 Fri. per cal. yr. ² 7 a.m. to 9 p.m. ¹
	Sat.	Up to 26 Sat. per cal. yr. ² , 7 a.m. to 9 p.m. only when combined with Friday work until 9 p.m. ¹
Blasting	Mon. – Fri.	11:30 a.m. to 1:30 p.m. max. 3 times per week
Quarry Office Use	Mon. – Sun.	No Restrictions

¹ In limited circumstances, if barge loading or trimming is not completed by 9 p.m., loading/trimming may continue until completed, but in no case shall barge loading/trimming occur later than 10 p.m. The Permittee shall maintain records of loading that occurs between 9 and 10 p.m. and shall make those records available to the community.

² The reference to “per cal. yr.” means that no more than a total of 26 such exceptions shall be exercised per calendar year, not 26 such exceptions per season. (*Mitigation Measures P4.1-9, P4.2-6c, P4.2-7a, P4.2-7d, C4.2-9b & P4.6-6b*)

a. The Permittee shall provide 36 hours advance notification of any of the above operations occurring later than 7 p.m. Fridays or on Saturdays to the Director of Public Works and by posting the date and activity type on a publically accessible web site.

b. The Permittee shall attempt to schedule any of the permitted 10 days of Saturday noise producing maintenance to be scheduled on the same days when weekend barge loading operations occur.

33. *Declared Public Emergency:* The hours and days of operations limitations, as well as truck trip per day limitation and trucking hours, may be suspended when there is a public emergency. A public emergency exists only when there is need to prevent or respond to a landslide, levee failure, structural failure, or other imminent harm from an earthquake, flood or other natural disaster, and when the emergency has been declared by an authorized local, state, or federal government agency. Any suspension shall last only as long as is necessary to deliver by truck or barge the material necessary for correcting the adverse conditions constituting the emergency. The public emergency suspension shall not increase, nor will there be any adjustment, regarding the 5 year annual average production (Condition 5). The suspension shall not be approval to increase plant capacity from those permitted.

Public Emergency Procedures

a. Within five (5) calendar days following Permittee’s determination to suspend aforementioned operations limitations, the public emergency shall have been declared by an authorized local, state, or federal government agency;

b. Within 24 hours after invoking the suspension under this paragraph, the Permittee shall send written notice to Marin County Director of Public Works in this matter and post on its website an explanation of the location of the public emergency and sufficient facts regarding the suspension to allow all parties to evaluate if the suspension is necessary and appropriate;

c. If the Marin County Director of Public Works determines at any time, based on the facts and notice provided in the preceding paragraph and/or from any other information the Director may obtain, that any suspension invoked by the Permittee is not being invoked as a result of a declared local, state or federal emergency, the Director may order termination of that suspension by written notice to the Permittee and the Permittee shall immediately comply with that written notice.

d. Within 24 hours after the suspension is lifted, or the emergency declaration by the authorized local, state, or federal agency is no longer in effect, the Permittee shall send written notice to the Marin County Director of Public Works, and post on its website, the total hours of operation and number of truck-trips that occurred during the suspension.

34. Reclamation grading activities shall be limited to an 8-10 week period during each dry season, but shall not commence prior to April 15 nor active grading extend beyond October 15th. Erosion control measures may continue to be implemented after October 15th. (*Mitigation Measure R4.6-5a*)

a. Each year by May 1 and not later than 30 days prior to the commencement of reclamation activities, the Permittee shall inform by mail all residences on Marin Bay Park Court, Heritage Drive, and San Marino Drive, and the public at large by web site posting, of the start date, nature of the work and expected duration of the 8-10 week period during which reclamation grading activities will occur that calendar year. (*Mitigation Measure R4.6-3d*)

35. *Lighting*: Permittee shall restrict and minimize lighting for night operations. Where lighting is necessary, Permittee shall utilize light shades, directional lighting, and other measures so as to minimize off site glare at residences adjacent to property.

Trucking

36. The Permittee shall limit daily truck traffic hauling aggregate, asphaltic concrete, rock and other quarry product from the Quarry to 250 one-way truck trips per day (125 in and 125 out). (*Mitigation Measures P4.6-6a & P4.2-7a*)

a. The Permittee shall keep daily written records of truck trips in and from site and shall provide said records to the Department of Public Works upon request. Records shall include date, load weight or bill of lading, and time of departure, as well as daily number of inter-facility trucks and destination of non inter-facility trucks. Records of truck trips shall include in-bound trucks not used for rock and aggregate transport, e.g. asphalt batch plant oil, and diesel loads. Records shall be kept a minimum of one year and an annual calendar year tabulation shall be provided in an Annual Report.

37. All loaded trucks shall be required to pass over a material shakedown area before exiting the Quarry.

38. All trucks leaving the Quarry shall be washed down, including the undercarriage, prior to entering Point San Pedro Road (except trucks transporting asphalt). The wash down and adjoining areas shall be paved to minimize tracking of dust and dirt. Point San Pedro Road shall be swept by a sweeper truck two times per day by the Quarry, except on rain days, when sweeping is not required. Sweeping is subject to the approval of the City of San Rafael within City jurisdiction.

This condition applies as well to Phase 4 reclamation for any loaded trucks.
(*Mitigation Measure R4.2-1c, R4.2-1d, R4.2-2a & P4.2-6a*)

39. The access road leading between the scale house and Point San Pedro Road shall be paved.

40. The Permittee shall require all inter-facility trucks (those trucks transporting material from the Quarry to other facilities under ownership or control of the Permittee, its parent company or subsidiaries) to cover or tarp the load in order to prevent or reduce dust emissions.

41. Any material shipment from the Quarry to Dutra's currently proposed Haystack Landing facility in Petaluma shall be by barge only, provided that the facility is approved by the County of Sonoma with a barge unloading component and the barge unloading component is constructed.

42. Within 12 months of Permit approval the Permittee shall require that all trucks leaving the Quarry loaded with aggregate or asphalt materials shall have their loads covered by tarp or other means to prevent fugitive dust. Upon Permit approval, the Permittee shall notify their customers and post this requirement on a web site. Permittee shall incorporate this requirement in all applicable third party contracts or agreements. Aggregate materials shall have the same meaning as California Vehicle Section 23114.

43. The Permittee shall provide a pull out area onsite after exiting the truck scales for truckers to check their load and/or tarp their load.

44. Trucks leaving the Quarry shall be metered by the Permittee at a minimum of 2 minute intervals during peak traffic periods. The peaks periods shall be approximately 2 hours long in the a.m. peak, and 1 hour long in the noon time and p.m. peaks, as determined by the Public Works Director.

45. Permittee shall install and maintain a conspicuous sign onsite near all exits from the Quarry that states the following: "TRUCKS SHALL NOT USE NORTH SAN PEDRO ROAD." Such prohibition shall not apply in the event of temporary closure or blockage of Point San Pedro Road. In such case, Permittee shall immediately notify the Department of Public Works of trucks from the Quarry using North San Pedro Road.

46. Permittee shall be responsible for cleaning up material spills on Point San Pedro Road from loaded trucks leaving the Quarry.

47. The Permittee shall routinely advise in writing, but no less than once per calendar year, and shall train all Quarry employees, Permittee leased truck operators and inter-facility truck drivers of the following trucking 'rules of the road'. The Permittee shall implement a progressive discipline policy on violating the

trucking rules. Drivers who repeatedly violate trucking rules shall be prohibited from hauling materials from the Quarry by the Permittee. Independent truck drivers shall be provided with written 'rules of the road', either through their company or individually, and are to be held to the same requirements. If an independent truck driver is found to repeatedly violate trucking rules, they too shall be prohibited by the Permittee from driving loaded trucks from the Quarry. Sign(s) notifying drivers of these requirements shall be posted onsite in the vicinity of the scale house location. The following minimum trucking rules apply:

- a. Drivers shall keep their vehicles within prescribed legal speed limits at all times.
- b. Trucks are not permitted to park and stage along Point San Pedro Road (which is particularly an issue in the early morning hours before the Quarry gates are opened).
- c. Trucks are not permitted to enter the Quarry before business hours.
- d. Trucks are not permitted to convoy on Point San Pedro Road.
- e. Drivers shall avoid using 'jake brakes' on Point San Pedro Road except in emergencies.
- f. All material spills on public roads shall be reported to the Quarry immediately.
- g. Truck drivers and the trucking equipment shall comply with all federal, state, regional and local laws and ordinances.

48. The Permittee shall assign an employee with job duties as a 'Truck Marshall' to, on a daily basis, periodically inspect trucks travelling on Point San Pedro Road and departing the Quarry site for compliance with these applicable Permit conditions and trucking rules of the road. The Truck Marshall shall keep written records of inspections and any warning or action taken against a truck driver violating the Permit conditions or trucking 'rules'. The records shall be provided to the Department of Public Works upon request. The records shall be kept at least one year.

49. To reimburse the County and City of San Rafael for extra wear and tear to roads caused by the Quarry truck traffic, the Permittee shall annually (the remaining year after Permit approval shall be prorated based on allowed trucking days) obligate in kind materials (asphalt concrete and/or aggregate) with a total market value of \$100,000. The annual unused obligations shall accumulate from calendar year to calendar year, i.e., if all or part of the material was not used by the local jurisdictions in a calendar year, then the obligation would be added to the following year's obligation and made available to the County or City. Annual unused

obligations shall accrue up to a maximum of \$300,000. The Quarry shall annually report obligation used and unused in an annual report to the County. The County shall track the obligations and expenditures. The County shall work with the City of San Rafael to equitably use the materials, but the County shall retain final authority on use of the materials on Point San Pedro Road, or alternatively:

- a. The Public Works Director may substitute the following instead of an annual asphaltic concrete requirement for Point San Pedro Road described above. Upon 3 month notice by the Public Works Director, the Permittee shall provide as much as 12,000 tons of open grade asphaltic concrete for a project to repave Point San Pedro Road. Truck trips due to trucks delivering asphalt for this project shall not count against the daily truck trip limit (refer to Condition 36). Grindings from the Point San Pedro Road project shall be delivered to the Permittee quarry property and accepted at no cost to County or contractor (no tipping cost). If the project occurs later than December 31, 2011, the maximum tonnage shall be adjusted based on the ENR Bay Area Caltrans asphaltic oil index.

Air Quality

50. The Permittee shall use a minimum blend 20 percent biodiesel and 80 percent conventional diesel (B-20) biodiesel fuel in all on-site quarry rolling stock. To further reduce emissions from off-road diesel equipment, the applicant shall fuel on-site diesel-powered mobile equipment used in operations or reclamation activities with a minimum 80 percent biodiesel blend (B-80) or use other equipment and/or fuel that achieves the same reduction in particulate (PM-10) emissions. The applicant shall also use Purinoxtm, or another County or BAAQMD approved additive, or other measures to reduce NOx and PM-10 emissions to the maximum extent feasible given current technologies. This condition applies to all reclamation phases, including Phase 4 (last phase) reclamation. Permittee shall provide records in the annual report or upon request by the County documenting compliance with this condition. *(Mitigation Measures R4.2-1a, R4.2-1d, R4.2-1g, R4.2-2a, R4.2-3a R4.2-3b, P4.2-6a, P4.2-7b & C4.2-9a)*

51. The Permittee shall operate a fleet of non-road diesel equipment to USEPA Tier 3 or higher standards, including for Phase 4 reclamation. The Permittee shall upgrade its tug boat fleet operating at the SRRQ to Tier 2 standards within one year of Permit approval. *(Mitigation Measures R4.2-1b, R4.2-1d, R4.2-2a, & P4.2-6a)*

52. The Permittee shall continue to use existing emission reduction practices, including use of alternative fuels, use of low-emission diesel equipment, and dust abatement measures (as found in other Permit conditions). *(Mitigation Measures R4.2-1d & P4.2-6a P4.2-6b P4.2-7c & C4.2-9a)*

53. Within one year of Permit issuance, the Permittee shall prepare and implement a Greenhouse Gas (GHG) Reduction Plan. The plan will include a complete inventory of reclamation-related GHG emissions and will demonstrate how the Quarry will reduce or offset remaining un-mitigated GHG emissions as identified

in the Combined EIR. The plan will prioritize emission reduction through energy conservation and other measures; and for those emissions that cannot be reduced, the plan shall specify how emissions will be offset. Offsets may take the form of installation of on-site alternative energy generation facilities (such as solar power) or off-site compensation, such as monetary contribution to a project that sequesters carbon. Examples of such projects include wetland restoration, purchase of carbon credits verified by the California Climate Action Registry, and reforestation. On-site offsets will be given higher priority than off-site offsets, and offsets with co-benefits, such as reduction of particulate emissions within the vicinity of the Quarry, and restoration of habitat for special status species, will be given higher priority. The plan must demonstrate how, at a minimum, the Quarry will reduce reclamation-related, non-biogenic GHG emissions consistent with the Marin County Greenhouse Gas Reduction Plan and Countywide Plan Update policies: the plan must demonstrate how reclamation-related emissions are reduced or offset, such that total emissions are 15% below the emissions associated with Amended Reclamation Plan 1982 (ARP82), or no more than 2,489 tons of eCO₂. The plan will include an implementation schedule. The plan will be submitted to the Marin County Public Works Department for review and approval. The Greenhouse Gas Reduction (GHG) Plan shall also include an inventory of operations-related GHG emissions and a plan to reduce these emissions by 15 percent. In addition, the initial emissions inventory prepared as part of the plan will be reported to the California Climate Action Registry or a successor organization as a baseline inventory, and the Quarry will conduct and report additional inventories annually. (*Mitigation Measures R4.2-3c & P4.2-7e*)

54. The Permittee shall implement the following dust abatement measures identified by BAAQMD as feasible dust control, during all reclamation grading activities or operations, including through the end of Phase 4 reclamation (*Mitigation Measures R4.2-1e, R4.2-2b P4.2-6b P4.2-7c & C4.2-9a*):

- a. Cover all trucks hauling soil, sand, and other loose materials as a part of reclamation activities, or require such trucks to maintain at least two feet of freeboard between the top of the material and top of truck.
- b. Pave, apply water at a minimum three times daily in dry weather, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at the Quarry;
- c. Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the Quarry;
- d. Hydroseed, apply non-toxic soil stabilizers, or water to inactive reclamation areas (previously graded areas inactive for ten days or more);
- e. Limit traffic speeds on unpaved roads to 15 miles per hour;

- f. Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
 - g. Replant vegetation in disturbed areas as soon as the growing season dictates. Install wind breaks or plant trees/vegetative wind breaks at the windward sides of the reclamation areas until such time as the vegetation is established;
 - h. Suspend reclamation-related excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour in the area being graded as measured by a hand held anemometer; and
 - i. Limit the area subject to reclamation-related excavation, grading and other construction activity at any one time.
55. The Permittee shall implement the following additional dust abatement measures:
- a. Initial clearing of areas to be mined, including removal and stockpiling of topsoil, shall be accompanied by surface watering to control dust generation.
 - b. Stockpiles of crushed rock shall be kept moist or shall be watered before loading.
 - c. Minimize drop heights while loading/unloading aggregate to the maximum extent feasible.
 - d. The operator of a facility/operation shall not cause or allow any visible fugitive dust plume from exceeding 100 feet in any direction from any mining or grading activity, equipment, storage pile, or disturbed surface area. Blasting is exempt from this condition (reference South Coast Air Quality Management District Rules).
56. The Permittee shall keep all off-road equipment well-tuned and regularly serviced to minimize exhaust emissions, and shall establish a regular and frequent check-up and service/maintenance program for all operating equipment at the Quarry. Permittee shall provide documentation to the County in an annual report (*Mitigation Measures R4.2-1f, R4.2-3b, P4.2-6b, P4.2-7c & C4.2-9c*)
57. Off-road diesel equipment operators shall be required to shut down their engines rather than idle for more than 5 minutes, unless such idling is necessary for proper operation of the vehicle. (*Mitigation Measures R4.2-1h R4.2-3b P4.2-6b P4.2-7c & C4.2-9c*)

58. The Permittee will limit on-site mining operations on days on which reclamation grading activities are performed concurrently such that total criteria air pollutants emissions from the site are not increased above BAAQMD significance thresholds. To ensure the effectiveness of this measure, the Permittee will be required to maintain daily records and report to the BAAQMD and the County Public Works Department a record of reclamation and operations activities, with an estimate of emissions from each, at the end of each annual season of reclamation activities. The baseline for combined emissions is the current level of emissions for mining operations as shown in the Combined FEIR Table 4.2-13.1 plus the baseline emissions for the reclamation grading phase, as shown in Tables 4.2-10 and 4.2-11 of the Combined EIR. The limit for combined emissions from mining and reclamation will therefore be the sum of the current emissions levels from mining operations, the baseline emission levels for reclamation grading, and the BAAQMD's threshold values for criteria pollutants, as shown in the Combined FEIR Table 4.2-10.1 for all reclamation phases. (*Mitigation Measures R4.2-1j, P4.2-6b, P4.2-7c & C4.2-9c*)

59. If the Permit conditional mitigation measures do not reduce emissions to below threshold values, the Permittee shall acquire BAAQMD off-site emission offset credits in sufficient quantity to reduce criteria air pollutant emissions from reclamation grading only to levels below BAAQMD significance levels. (*Mitigation Measures RR4.2-1i, P4.2-6b, P4.2-7c & C4.2-9c*)

60. The Permittee shall suspend excavation, grading, hauling, and/or unloading soil and rock (except within the quarry bowl) activities when wind gusts exceed 25 mph, as measured at the top of the quarry bowl. Wind speed shall be determined when an on-site anemometer registers at least two wind gusts in excess of 25 miles per hour within a consecutive 30-minute period.

61. New onsite diesel equipment, or new or used replacement of onsite diesel equipment purchase after Permit approval shall meet or exceed EPA 2003 emission standards for diesel particulate matter (DPM) reduction controls. The Permittee shall provide a report, on an annual basis, to the County when heavy equipment changes occur on-site which identifies and describes the additional or new replacement equipment with regard to emission standards.

62. Within 4 months of Permit approval, Permittee shall provide a public forum to consult with residents along Point San Pedro Road on purchase of a vacuum sweeper truck, the primary concerns being dust collection efficiency and sweeper noise level. Within an additional 5 months (9 months total) Permittee shall implement use of a vacuum truck street sweeper on Point San Pedro Road (currently broom sweeper). Point San Pedro Road shall be swept to remove aggregate and road dust two times per day during business hours by the Quarry when trucking from the Quarry occurs, except on rain days, when sweeping is not required. Sweeping is subject to the approval of the City of San Rafael within City jurisdiction.

63. Permittee shall maintain all quarry-operated equipment in accordance with manufacturers' recommendations to reduce exhaust emissions from heavy equipment and haul trucks.
64. All non road diesel trucks and road diesel trucks shall meet or exceed federal and State emission regulations and requirements.
65. The Permittee shall maintain all required erosion control measures and stormwater management plans, and shall keep current and comply with all permits required by the Regional Water Quality Control Board. This condition applies through the end of reclamation (Phase 4). (*Mitigation Measures R4.2-1c, R4.2-1d, R4.2-2a & P4.2-6a*)
66. The Permittee shall maintain all dust abatement devices and air pollution control devices, and shall keep current and comply with all permits required by the Bay Area Air Quality Management district (BAAQMD). This condition applies through the end of reclamation (Phase 4). (*Mitigation Measures R4.2-1c, R4.2-1d, R4.2-2a P4.2-6a & C4.2-9a*)
67. Copies of all BAAQMD permits for the Quarry property shall be provided to the Department of Public Works. The Permittee shall document compliance with BAAQMD permits as part of the Annual Report.
68. Recordkeeping: The Permittee shall keep the following records on-site for 3 years and make such records available to the Public Works Director upon request:
- a. Watering and sweeping schedule for on site quarry operations or reclamation;
 - b. Days when reclamation or other operations were suspended due to high winds (greater than 25 mph) or days when work was suspended because of visible dust plumes greater then 100 feet;
 - c. Days of non-toxic dust suppressant application other than water;
 - d. Annual use of Purinox or similar additive; and
 - e. Quarry operations engine hours curtailed when reclamation equipment is in use and engine hours and equipment type of reclamation equipment used.
69. Permittee shall fund an on-going air quality monitoring program by the County to measure ambient air quality in the vicinity of the Quarry. The monitoring shall focus on measuring respirable particulate matter (PM-10 & PM-2.5) and determining metals content of particulate matter using BAAQMD and State monitoring standards. The monitoring program shall be funded sufficiently before reclamation activities

begin in the Northeast Quadrant. The air monitoring program will be operational for two full consecutive years. Thereafter, at the discretion of the Public Works Director, the continuous monitoring program may be suspended should long term monitoring results document that the Quarry operations or reclamation activities do not cause exceedences of state and federal air quality standards, or should the program be suspended, the Public Works Director may recommence the air monitoring program. Monitoring shall occur when reclamation grading activity occurs in the Northeast Quadrant. A one year continuous monitoring program shall be implemented should state or federal ambient air quality standards change.

Noise

70. Noise levels due to Quarry operations or reclamation, measured at the residential receptor property line, shall be limited to: 60 dBA day/night Ldn, 70 dBA maximum (sound level measurement made with “slow” meter response) and 65 dBA impulsive (sound level measurement made with “fast” meter response).

71. Within 30 days of permit issuance, the Permittee shall provide the County with the name and telephone number of the individual empowered to manage operational noise from the quarry. The individual’s name, telephone number, and responsibility for noise management shall be posted at the project site in a location easily visible to the public and on the Quarry’s web site. The individual shall record all noise complaints received and actions taken in response, and submit this record to the County upon request and annually at the time of the Annual Report.

72. The Permittee shall implementation of the following noise abatement measures to reduce the annoyance impact of reclamation activity noise (*Mitigation Measures R4.6-3c, R4.6-5b R4.7-1b*):

- a. The applicant shall limit all reclamation grading activities in the NE Quadrant or berm construction in NW Quadrant to 7:00 a.m. to 5:00 p.m. Monday through Friday.
- b. Equipment and trucks used for all construction and reclamation activities shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds).
- c. All construction equipment powered by internal combustion engines shall be properly muffled and maintained;
- d. Unnecessary idling of internal combustion engines shall be prohibited.

73. The Permittee shall retrofit all rolling vehicles with backup alarms at the quarry with broadband backup alarms. Broadband alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), by being 5 dBA

quieter than conventional back-up alarms, and by generating noise that has a less intrusive tonal quality. (*Mitigation Measure R4.6-3a, R4.7-1a*)

74. The Permittee shall implement the following noise reduction program which shall be maintained in good operating condition:

- a. Enclose the conveyor systems at the Quarry crushing and processing plant including barge loading, primary, and secondary conveyors.
- b. Screens and secondary crushers shall have sound curtains with sound deadening materials installed between the equipment and residences.
- c. Enclosed transfer points along the conveyor system where material transfers from one belt to another by means of a hopper. The enclosures shall incorporate sound deadening materials.
- d. Permittee shall line all unenclosed hoppers and chutes on the conveyor at which aggregate materials fall onto a metal surface with a sound deadening material such as heavy neoprene, rubber or HDPE.
- e. Permittee shall implement the above noise reduction program as a phased program over 3 years from Permit approval. The noise reduction program shall include a barge loading noise reduction component to be included in the phasing plan. Proposed plans and phasing shall be prepared by a qualified acoustical engineer and then provided to the Public Works Director within 6 months of Permit issuance for review and approval. The phasing goal is to have the noisiest equipment, relative to nearby residences, retrofitted in the first 12 months following plan approval. The applicant shall have a qualified acoustical engineer inspect the site and equipment and submit a verification of compliance with these conditions after each phase.

75. The flat deck barge fleet associated with Permittee quarry operations shall be fully converted to concrete deck barges within three years. At least two steel deck barges shall be converted per 500,000 tons of annual (calendar) quarry production. Within three years of Permit approval, only non metallic flat deck barges, i.e. concrete deck barges, shall be permitted to be loaded at the Quarry site.

- a. Upon Permit approval, only concrete surface flat deck barges shall be loaded later than 8 p.m.
- b. Non-concrete surface flat deck barges from contracted third parties may be used in a declared public emergency.

76. Engines on all equipment used for surface mining operations shall be equipped with manufacturer-recommend mufflers, and no muffler or exhaust system

shall be equipped with a cutout, bypass, or similar device intended to thwart quieting.

77. Permittee shall fund an on-going noise monitoring program by the County to measure ambient and Quarry noise levels in the vicinity of the Quarry. Noise monitoring shall occur at the property line annually at the start of each season of reclamation work in the Northeast Quadrant and shall last the entire period of Northeast Quadrant activity. The noise monitoring program i.e., number of stations station locations, and other operational monitoring characteristics, shall be as required by the Public Works Director and performed by an acoustical consultant retained by the County. If the Permit noise levels are not met, the Permittee will have 15 days to correct the problem. If after 15 days the problem has not been corrected, the Permittee will only be allowed to operate compliant equipment, which will meet the permitted noise levels.

Blasting

78. Blasting shall be limited to an annual (calendar year) average of two times per week (104 times per year) and a maximum of three times per week. (Mitigation Measures P4.1-9, P4.2-6c, P4.2-7a, P4.2-7d, C4.2-9b & P4.6-6b)

79. Blasting shall be limited to the hours of 11:30 a.m. to 1:30 p.m. Monday through Friday. No blasting is to occur on State holidays or weekends.

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

81. The Permittee shall design blasts to maintain a minimum scaled distance of 52.8 ft/lb^{1/2}, as defined in the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume III: Appendices. The Permittee shall provide the County with a blast report providing charge weight, delay, and other information needed to confirm compliance with these conditions, with 24 hours following each blast.

82. All charges should be confined with clean crushed stone of height equal to or greater than 25 charge diameters, as defined on Page 21 of the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume III: Appendices.

83. All charges should be confined with rock burden equal to or greater than 25 charge diameters, as defined on Page 21 of the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume III: Appendices.

84. Air-overpressure measured near residential home should never exceed 133 dBL, as measured with 2-Hz monitoring equipment.

85. Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.25 inches per second.

86. All blast monitoring of ground motion and air-overpressure effects done by either Permittee personnel or third-party service providers should be done in full conformance with ISEE guidelines provided in Attachment I of the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume III: Appendices. *(All above in Blasting section, Mitigation Measures P4.7-7a, P4.7-7b)*

87. No blasting shall take place when wind velocity equals or exceeds 25 miles per hour. The wind speed shall be measured at the top of the quarry bowl.

88. No blasting shall take place on days when 'Spare the Air Days' declared by Bay Area Air Quality Management District are in effect, provided the BAAQMD gives at least 48 hours notice.

89. Within 60 days of Permit approval Permittee shall prepare and provide to the County a graph showing distance (ft.) to nearest off site residence and charge weight per delay (lb) using the scale factor and detonation delay of individual charges of 8 milliseconds or greater.

90. Permittee shall fund an on-going blasting seismic and air overpressure monitoring program of up to 3 stations, as determined by the Marin County Public Works Director.

Biological Resources

91. The Permittee shall implement amended reclamation plan "Standards for Preserving Sensitive Habitat Areas." Implementation of these standards will protect specific areas of oak woodland and native grassland. *(Mitigation Measure R4.3-2a)*

92. The Permittee shall submit to the Marin County Department of Public Works a revised 'conforming reclamation plan' that includes the preservation of the small hill near the kilns, consistent with ARP82. Any plans for future alteration of the small hill for post-reclamation development may be proposed as part of the Development Plan, due to be submitted three years prior to the cessation of mining. The conforming reclamation plans shall continue to preserved areas originally described, including portions of South Hill, the Grassy Knoll, and the marsh areas *(Mitigation Measures R4.3-2b R4.3-3a, R4.3-4a, R4.3-4b)*

93. Prior to each reclamation phase and during the planning for post-reclamation development, presence/absence surveys for special-status plants will be conducted by an independent qualified botanist within areas to be disturbed. *(Mitigation Measure R4.3-3b)*

- a. Surveys will be conducted in accordance with CNPS and CDFG rare plant survey guidelines.

- b. Surveys will be conducted prior to the start of each phase of reclamation activities, during the flowering period when the species is most readily identifiable (June – October).
- c. The results of the surveys will be filed with the County; if the presence of any of these species is confirmed, a copy of the survey results will be forwarded to CDFG, and following Permit condition will be implemented.
- d. In the event that special-status plants are proven absent, then no additional mitigation is necessary.

94. In the event that special-status plant populations are found during the surveys conducted pursuant to the above condition, the Permittee will avoid disturbance to the species by establishing a visible buffer zone of not less than 25 feet prior to construction or by relocating reclamation activities, if feasible, to avoid disturbance. Where necessary reclamation activities cannot be altered to avoid disturbance, the applicant shall relocate affected special-plant populations and/or restore similar habitat in another location: *(Mitigation Measure R4.3-c)*

- a. Protection of special status species will be coordinated by a qualified biologist.
- b. Disturbance or mortality of special status plant habitat and species shall be avoided as a priority. If a qualified biologist determines that restoration would provide equivalent or more effective mitigation, special-status plant habitat and/or sensitive plant communities may instead be restored on-site at a 2:1 ratio in areas that are to remain as post-reclamation open space, such as the Grassy Knoll or within the salt marshes.
- c. Special-status plants and/or seeds will be salvaged from areas of disturbance and moved to restoration areas on or off the site; if this is not feasible, an alternate source of seed or plant material will be selected by a qualified biologist.
- d. A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards will include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and a functioning, self-sustaining plant community at the end of five years.
(Mitigation Measure R4.3-c)

95. The Permittee will implement the following measures in order to minimize damage to protected trees that are to be preserved on-site: *(Mitigation Measure R4.3-4c)*

- a. Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, preserved trees that occur adjacent to project construction areas shall be identified as preserved and clearly delineated by constructing short post and plank walls, or other protective fencing material, at the dripline of each tree.
- b. The delineation markers shall remain in place for the duration of the work.
- c. Where reclamation activities would encroach upon the dripline of a preserved tree, special construction techniques will be required to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, use of hand equipment for tunnels and trenching, and/or allowance of only one pass through a tree's dripline).
- d. Tree wells or other techniques may be used.
- e. The following shall not occur within the dripline of any retained tree: parking; storage of vehicles, equipment, machinery, stockpiles of excavated soils, or construction materials; or dumping of oils or chemicals.
- f. If a tree within a preserved area is damaged or destroyed, the applicant shall replace the tree at a ratio of 2:1 with trees of the same species. Tree replacement shall be performed by a certified arborist. *(Mitigation Measure R4.3-4c)*

96. All pruning activities of preserved trees shall be performed by a certified arborist. No more than 25 percent of a tree's canopy shall be removed during pruning activities of retained trees. *(Mitigation Measure R4.3-4d)*

97. The Permittee shall develop and implement a five-year monitoring program for any required replacement plantings, as specified in Combined EIR Mitigation Measure R4.3-4c. The performance standards for tree replacement include all of the following: 75 percent survival rate of restoration plantings; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and self-sustaining trees at the end of five years. If these criteria are not met, the applicant shall re-plant and success shall again be assessed after five years. *(Mitigation Measure R4.3-4e)*

98. All jurisdictional wetland areas to be avoided shall be protected by setbacks throughout site reclamation and post-reclamation development consistent with the Baylands Corridor designation of the site in the 2007 Countywide Plan:

- a. Setbacks for the NW Quadrant marshes shall be consistent with the requirements of the Baylands Corridor designation for the site. During reclamation activities, no temporary or permanent reclamation stockpiles,

berms, or other features shall be placed within 100 feet of the NW Quadrant marshes. Buffers shall be included as part of post-reclamation development design in the vicinity of the NW Quadrant marshes and shall be a minimum of 100 feet in width.

b. Setbacks for seeps and seasonal wetlands shall be a minimum of 50 feet.

c. Areas that are avoided and provided with setbacks will be further protected by Best Management Practices (BMPs), as described in the Combine EIR Mitigation Measure R4.3-5d. Such measures include the installation of silt fencing, straw wattles or other appropriate erosion and sediment control methods or devices along roads and at the 100 foot setback limits. Such BMPs shall also be employed if and when reclamation grading and post-reclamation development requires work within the setbacks as described above, between the feature and the activity. (*Mitigation Measure R4.3-5a, C4.3-18a, R4.3-5b, & 4.3-12a*)

99. All necessary jurisdictional wetland permits and approvals of appropriate regulatory agencies shall be obtained prior to each relevant phase of reclamation. Copies of the permits or approvals shall be provided to the Department of Public Works. (*Mitigation Measure R4.3-5c*)

100. The Permittee shall conduct reclamation activities in a manner that avoids erosion and sedimentation of wetland areas, through implementation of standard BMPs to maintain water quality and control erosion and sedimentation during construction as required by compliance with the General National Pollution Discharge Elimination System (NPDES) Permit for Construction Activities and as established by mitigation measures set forth in the Combined EIR and this Permit.

101. Water quality and Best Management Practice mitigation measures include, but not limited to, installing silt fencing between jurisdictional waters and project related activities, locating fueling stations away from potentially jurisdictional features, and otherwise isolating construction work areas from any identified jurisdictional features. In addition, BMPs identified in the Long-term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) (Corps, 2001) shall be implemented to prevent degradation of water quality resulting from dredging activities within open waters. These BMPs include: silt fencing and gunderbooms or other appropriate methods for keeping dredged materials from leaving the project site. (*Mitigation Measure R4.3-5d*)

102. The Permittee shall revise the amended reclamation plan to include as a standard for guiding development of the Development Plan that post-reclamation residential, commercial, and mixed use development, except as otherwise permitted by BCDC, shall not occur within the 100 foot shoreline band subject to BCDC

jurisdiction. This revision shall be provided at the time of the Conforming Amended Reclamation Plan. *(Mitigation Measure R4.3-5e)*

103. Prior to open-water construction activities, the Permittee shall obtain the necessary permits from the US Army Corps of Engineers (USACE) and other regulatory agencies. Open-water construction will not begin prior to obtaining necessary permits. Copies of the permits or approvals shall be provided to the Department of Public Works. *(Mitigation Measure R4.3-6a)*

104. All open-water construction activities shall adhere to the guidelines of the then-current version of the LTMS. *(Mitigation Measure R4.3-6b)*

105. To minimize wetland disturbance, the construction of the connecting channel from the Main Quarry Bowl to the Bay, and removal or installation of rip-rap along the Bay shoreline, will either operate from dry land or from water-based equipment such as barges, scows, derrick barges, and tugs. *(Mitigation Measure R4.3-6c)*

106. Permittee shall include surveys for California red-legged frog (CRLF) in its "Standards for Preserving Sensitive Habitat Areas," to be conducted prior to filing for grading permits for each reclamation phase, as well as undefined setbacks to be established in the site's Development Plan. *(Mitigation Measure R4.3-8a)*

107. The Permittee shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW and SW Quadrants in a manner that avoids take of California red-legged frog (CRLF) through surveys to determine whether the species is present, and, if so, to reduce the risk of take of individuals of the species, as specified below. The Permittee shall conduct quarry operations in a manner that avoids take of CRLF. Specifically, the following measures shall be implemented *(Mitigation Measures R4.3-8b, P4.3-13)*:

a. The Permittee shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines prior to filing for grading permits for Reclamation Phase 1 or prior to any site disturbing activity within 300 feet of the ponds or fresh water marsh. The habitat assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process water ponds in the NW and SW Quadrants) on the project site. The Permittee shall provide the County with the results of the habitat assessment, USFWS review, and protocol level surveys, if required, prior to any site disturbing activity within 300 feet of the subject areas.

b. If no CRLF are found during the habitat assessment and/or protocol level surveys associated with Phase 1 reclamation activities then the project proponent shall consult with USFWS as to the necessity of conducting further

assessments or surveys for Phases 2 through 4 and/or for post-reclamation development.

c. If, as a result of the habitat assessment and/or protocol level surveys, CRLF are found on the project site, the project applicant shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the federal Endangered Species Act). Specific measures to protect CRLF shall be determined in consultation with USFWS and may include, but are not limited to, the following measures, which are derived from the USFWS Programmatic Biological Opinion (PBO) for impacts to CRLF. The PBO summarizes typical project effects and provides generic preventive measures designed to substantially reduce the risk of incidental “take” of CRLF within the project area:

i. The name and credentials of a biologist qualified to act as construction monitor shall be submitted to USFWS for approval at least 15 days prior to commencement of work.

ii. A qualified biologist shall conduct pre-construction surveys within aquatic habitat by two weeks prior to the onset of construction activities. Surveys shall be completed for all life cycle stages of CRLF (e.g., egg masses, tadpole, juveniles, and adults) that may occur within the project area. If adult CRLF, tadpoles or eggs are found within the construction disturbance zone, the approved biologist shall contact USFWS to determine if moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved biologist shall be allowed sufficient time to move them from the construction sites before work activities begin. If no frogs are detected during these surveys, construction-related activities may proceed without further requirements for the protection of individuals, although habitat protection measures (i.e., avoidance of intermittent drainages and riparian habitat) shall still be observed.

iii. Exclusionary fencing, such as silt fences, shall be installed around the process ponds and around all construction areas that are within 100 feet of or adjacent to potential CRLF habitat. Once fencing is in place, it shall be maintained by the proponent until completion of construction within or adjacent to the enclosure.

iv. Prior to commencement of any earthmoving activities, the monitoring biologist shall train all construction personnel and work crews on the sensitivity and identification of the CRLF and the penalties for the “take” of this species. In addition, visual materials shall be provided to assist in identifying the species. Training sessions

will be repeated for all new employees before they access the project site and periodically throughout project construction.

v. The monitoring biologist will demarcate construction avoidance areas in the field and monitor construction activities within 300 feet of aquatic habitat for CRLF. The demarcation shall remain on-site until all initial vegetation clearing and habitat disturbance is completed.

vi. All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from any riparian habitat or water.

108. The Permittee shall conduct quarry operations, reclamation and post-reclamation development activities on site, and in and around the process water ponds in the NW Quadrant, in a manner that avoids take of northwestern pond turtle through surveys to determine whether the species is present, and, if so, to limit activities as specified below. Specifically, prior to any site disturbing activity within 300 feet of the NW Quadrant process water ponds or filing for Phase 1 reclamation grading permits, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform northwestern pond turtle (WPT) surveys within suitable habitat in and around the process ponds in the NW Quadrant. Surveys and subsequent actions shall include the following (*Mitigation Measures R4.3-9, P4.3-14*):

a. Surveys shall be conducted for nests as well as individuals.

b. If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas.

c. No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests.

d. If a nest is located within the process pond area and may be impacted by reclamation activities, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG.

e. A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG.

f. If no turtles are found during surveys associated with Phase 1 reclamation activities the project proponent shall consult with CDFG regarding the need for further future surveys.

109. The Permittee shall conduct quarry operations or reclamation activities involving tree removal and building demolition in a manner that avoids disturbance or mortality of bats, through surveys to determine whether bats are present, and, if so, to limit reclamation activities as specified below. Specifically, the applicant shall take the following measures to avoid direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula (*Mitigation Measures R4.3-10, P4.3-16*):

a. A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of all potential bat habitats within 500 feet of reclamation activities prior to initiation of such activities, including surveying trees slated for removal as a result of quarrying activity. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night).

b. Removal of trees or demolition of buildings showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal or building demolition.

c. A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Bat roosts initiated during construction are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals, including harming, harassing, or killing, will be prohibited.

d. If pre-construction surveys indicate that roosts are inactive or potential habitat is unoccupied during the reclamation, construction or mining periods, no further mitigation is required. Trees and buildings that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished.

e. If known bat roosting habitat is to be destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed at least two weeks prior to such disturbance in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist.

f. Prior to quarry-related tree removal a report shall be submitted to the County that details the survey results and any actions taken to protect special-status bats. Any special-status bat sightings shall also be submitted to the CNDDB.

110. The Permittee shall implement nesting raptor surveys described as part of the "Standards for Preserving Sensitive Habitat Areas in the amended reclamation plan. (*Mitigation Measure R4.3-11a*)

111. The Permittee shall conduct quarry operations and reclamation activities, including vegetation removal as well as variability in quarrying activity levels on South Hill in a manner that avoids direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success. Specifically (*Mitigation Measures R4.3-11b, P4.3-15*):

a. During the breeding bird season (January 1 through August 31) a qualified biologist will survey sites for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing or vegetation removal (including trees, shrubs, and grassland vegetation) activity. In addition, vegetation on South Hill will be surveyed if quarrying activities on South Hill cease for a period of more than one week during breeding bird season.

b. If reclamation activities occur only during the non-breeding season between September 1 and December 31, no surveys will be required.

c. Surveys shall also be conducted during breeding season in those areas of the project site that a qualified biologist determines may have nesting special status bird species present that could potentially be impacted by indirect noise impacts of operations such as truck traffic or blasting at that time.

d. Results of the surveys will be forwarded to the County and CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis. Avoidance procedures shall be reviewed and approved by CDFG. Depending on the species involved, these may include construction buffer areas (up to several hundred feet in the case of raptors) or seasonal restriction or avoidance of activities. Vegetation of any kind identified as supporting active nests will not be removed until nestlings have fledged. If survey results are positive for nesting birds, vegetation removal or mining on South Hill will not occur until submittal and review of reports and

implementation of any necessary avoidance measures. Special-status bird sightings shall also be submitted to the CNDDDB.

112. The Permittee shall submit revisions to the amended reclamation plan that include a standard for post-reclamation development (to be submitted three years prior to cessation of mining activities or by December 31, 2021, whichever is earlier) that requires the applicant to conduct post-reclamation development activities in a manner that avoids harassment, disturbance, and mortality of nesting birds and other wildlife that inhabit the SRRQ marshes. The standard will include development of a Marsh Wildlife and Habitat Protection Plan, to be prepared as a part of the Development Plan, and subject to review and approval by the Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. Components of the plan will include, but not be limited to, the following:

a. In accordance with the policies set forth in the 2007 Marin Countywide Plan the project development footprint will maintain a set back of at least 100 feet from marsh habitat on the project site.

b. Cyclone fencing with vinyl slats for screening shall be installed at the setback distance between the marshes and all residential or commercial development. Appropriate native vegetation will be planted both inside and outside of the fence to provide further screening. The fence will be designed specifically to provide a barrier to exclude cats, dogs, and other household pets from marsh areas and will also provide a visual screen between marsh wildlife and human activity.

c. To minimize the potentially-adverse effect of night lighting on the adjacent salt marsh habitat the following will be utilized: street lighting only at intersections, low-intensity street lamps and low elevation lighting poles, and internal silvering of the globe or external opaque reflectors to direct light away from marsh habitat. In addition, private sources of illumination around homes shall also be directed and/or shaded to minimize glare into the marsh.

d. An education program for residents will be developed including posted interpretive signs and informational materials regarding the sensitivity of the marsh habitat, the dangers of unleashed domestic animals in this area, and discouragement of the practice of feeding feral cats. (*Mitigation Measure R4.3-12b*)

113. The Permittee shall prepare a Marsh Restoration plan and implement the recommendations as soon as practicable, and in any case, shall complete the tidal marsh restoration prior to completion of Phase 1 reclamation. This mitigation measure will be implemented through the following:

a. The Permittee shall develop and submit a Marsh Restoration Plan to the County and other applicable resource agencies within 1 year of approval of the amended quarry permit. The Plan will include, but not be limited to, the following elements:

- i. A baseline study of existing marsh conditions, including topography, a complete analysis of current hydrology, vegetation, and wildlife that will be used to inform subsequent marsh restoration planning.
- ii. A thorough analysis of the potential effects of tidal restoration on adjacent infrastructure and existing marsh vegetation.
- iii. Development of a suite of restoration alternatives, with tidal restoration as the preferred alternative, providing constraints do not preclude this course of action.
- iv. Feasible goals for marsh restoration with quantifiable objectives that can be measured over time to determine whether goals are being met.
- v. A detailed plan for marsh restoration, including, if necessary to achieve objectives, plans for excavation of new channels, addition of new culverts, setbacks, buffers, etc.
- vi. A maintenance schedule for any mechanical devices or features, such as tide gates, specified in the plan.
- vii. A monitoring plan to determine optimum inundation levels for the marshes. This would include measurements of hydrology, sediment accretion, and changes in vegetation over time.
- viii. A schedule for annual monitoring reports, which shall be submitted to the Department of Public Works, as well as all permitting agencies as required. (*Mitigation Measure C4.3-18b*)

Geology/Geotechnical/Seismicity

Design

114. The Permittee shall include the recommendations made in the Supplemental Geotechnical Data Report Proposed Changes to Mining Plan by ENGeo, Incorporated dated April 11, 2005 as part of the quarry design and submittal of the Conforming Amended Reclamation Plan. These recommendations include conducting supplemental geotechnical pit observations, groundwater monitoring, and slope monitoring which shall be conducted by a California Certified Engineering Geologist or Registered Professional Geotechnical Engineer with oversight by the State Office of Mine Reclamation. In addition, the average slope inclination (toe to

top) shall not exceed 60 degrees for a maximum vertical height of 350 feet, a minimum of 30-foot-wide benches shall be constructed at maximum 90-foot intervals, and inter-bench face inclinations shall not exceed 75 degrees. (*Mitigation Measure R4.4-1 & R4.4-3b*)

115. The quarry access ramp placement required to deepen the quarry shall be configured to minimize excavation at the south face and create a buttressing effect to the slopes at the south side of the quarry.

116. Quarry pit design shall consider the potential effect of large-scale horizontal curvature of pit walls on slope stability. In general, convex-inward horizontal curves in quarry slopes should be avoided. Concave inward-sloped offer some degree of increased confinement by “arching” of the rock mass between discontinuities, and effectively decrease the area of free face available for kinematically possible failure geometries. Convex-inward slopes can actually contribute to potential instability, since lateral confinement is reduced and the area of the kinematically-available free face is effectively increased.

Monitoring

117. Mine quarry highwalls and the South Hill cut slope shall be periodically observed, mapped, and evaluated by a qualified engineering geologist and/or geotechnical engineer to determine if there are any rock structures or conditions that adversely impact or otherwise contradict the assumptions of the slope stability analyses provided with the 2004 Amended Reclamation Plan. In addition, the observations during mining would be to identify possible adverse rock structure as excavations proceed, so that the quarry operations can avoid undesirable slope failures in critical improvements such as access ramps or quarry brow improvements. At least annually, as part of the required SMARA mine inspection, the mine highwalls and South Hill cut slope shall be evaluated by a qualified engineering geologist and/or geotechnical engineer. If an adverse condition occurs, additional geotechnical studies shall be undertaken and slope modifications made to ensure stability of the final mine slopes. Copies of all evaluation reports shall be provided to the Department of Public Works as part of the Annual Report.

118. Piezometers shall be installed within a year following approval of the Permit around the margins of the quarry pit to allow periodic monitoring of ground water elevations to demonstrate that the assumptions in the slope stability analysis about pore water pressures are valid. The actual configuration of the piezometer array should be determined based on the final proposed pit configuration and on proposed planning of quarry operations to allow optimum placement of instruments and to avoid conflicts with future operations. Ground water level monitoring shall be done at least quarterly. Copies of all monitoring data and reports shall be provided to the Department of Public Works at least annually.

119. A network of survey monitoring points shall be established around the quarry pit and on benches to allow for measurement of any movement in the highwalls.

These monitoring points shall be surveyed initially at a monthly interval. The Quarry geotechnical engineer shall periodically evaluate whether additional survey points are necessary, and determine if more or less frequent survey monitoring is needed (reference page 77, ENGEO Supplemental Report). Results of this survey monitoring shall be reported to the Department of Public Works as part of the Annual Report.

120. The south face quarry access ramp shall be constructed to provide for a buttressing effect on the Wedge 1 failure area and any similarly unstable areas. Additional remedial grading and placement of engineered fill materials may be necessary to provide this buttressing effect. Any fill placed for structural support shall be designed, inspected, and tested by a qualified geotechnical or soils engineer. An engineer's report on placement and compaction of any engineered soils shall be provided to the Department of Public Works for review.

121. The periodic geotechnical inspections recommended above shall include evaluation of mining faces for potentially unstable blocks. Localized face failures are an expected part of surface mining, and the location and potential size of unstable blocks can be evaluated during periodic inspections as mining proceeds. If it appears that a critical facility such as the access ramp could be threatened by a potential block failure, the geotechnical engineer shall recommend appropriate correction action such as the installation of rock bolts, or local modification of mining excavations to increase stability.

122. The large-scale stability of the quarry walls shall be periodically evaluated by the geotechnical engineer based on the results of monitoring of slope performance, groundwater levels, and geotechnical inspection of mining exposures. If unacceptable slope performance is detected, it will be possible to implement several possible mitigation measures as described below. The actual recommended mitigation measures shall be based on site-specific evaluations:

- a. Mitigation measures shall be employed if adverse groundwater conditions are encountered (unacceptably high pore pressures or excessive seepage, etc.) Mitigation measures could include horizontal drains, extraction wells, slurry walls, etc.
- b. If unacceptable levels of mining-concurrent slope deformation are encountered, mining activities shall be modified to improve stability. At the quarry brow, stockpiles of products, quarry waste piles or areas of overburden can be excavated and moved to reduce driving forces. In the pit, bench configurations can be modified by "stepping out" or increasing bench width, effectively flattening the mining slope angle.

123. At the south quarry brow, it is anticipated that the final slopes will locally expose quarry fills and areas of native soils and weathered rock. The anticipated extent of soils and weaker materials in the proposed face is presented in Figure 13

of the ENGEO Supplemental Report. ENGEO Supplemental Report Figure 14 presents options for mitigation, including construction of a sheet pile wall or an engineered fill buttress. Both options would allow the quarry limits depicted in the Quarry's mining plan to be preserved. The Quarry shall select an appropriate method based on conditions actually encountered at the time of construction. The Quarry shall provide the engineering evaluation and method chosen to the Department of Public Works for review prior to implementation.

Future Geologic/Geotechnical Studies

124. A thorough re-evaluation of excavated slopes shall be performed near the conclusion of the mining operations, but no later than three years from mining cessation, so that the proposed post-reclamation conversion to secondary uses can be re-evaluated based on revealed conditions with a comprehensive re-evaluation of quarry slope stability based on the results of on-site geotechnical pit observations made during mining, groundwater monitoring, slope monitoring, and a program of laboratory testing of on-site materials. An appropriate testing program shall, as a minimum, include unconfined compressions tests, triaxial testing, and direct shear tests of joint surfaces. The re-evaluation shall be provided to the Department of Public Works.

125. The additional studies recommended in the condition above and the ENGEO Supplemental Report will include a study to determine how the site may be developed following reclamation in order to avoid or mitigate to less than significant impacts related to soil and slope stability. At the time the study is prepared, there will be a greater understanding of the bedrock stability and the properties and performance of the Quarry walls. A comprehensive re-evaluation of slope stability shall be performed based on results from geotechnical observations throughout the mining period, groundwater monitoring, slope monitoring, and laboratory testing of on-site materials which would include compression tests and shear tests of joint surfaces.

- a. The design-level, site-specific geotechnical investigation shall be prepared by a California licensed Geotechnical Engineer or Certified Engineering Geologist and include review of the supplemental geotechnical evaluations and monitoring conducted throughout the history of mining activities. The investigation shall include final grading recommendations, mitigation of any identified compressible or liquefiable soils, slope stability analyses, calculation of factors of safety, and structural foundation recommendations to ensure that post-reclamation development will be in accordance with the then-current requirements of the California Building Code and the Marin County Building and Safety Division or City of San Rafael Building Code. These recommendations shall be incorporated into the final design plans for post-reclamation development. (*Mitigation Measure R4.4-3c*)
- b. A qualified Geotechnical Engineer or Certified Engineering Geologist shall prepare a revised geologic map of the Quarry Pit and South Hill, and

provide supplemental recommendations, if any, for implementation of the proposed reclamation plan. The study shall confirm that the final mine slopes are stable and suitable for the proposed post-reclamation land use. As necessary, the study shall provide recommendations for any geotechnical investigation and/or analysis needed to demonstrate the stability of the slopes is suitable for any proposed post-reclamation end land use(s). The study shall be provided to the County. If determined by the County or engineering geologist, supplemental rock slope engineering recommendations shall be provided to maintain acceptable factors of safety for proposed adjacent land uses.

c. If the design-level, site-specific geotechnical investigation determines that achievement of factors of safety adequate for the intended post-reclamation uses are infeasible in some or all of the reclaimed Quarry, the report shall specify appropriate alternative post-reclamation uses or limitations on the planned use. An amended reclamation plan shall be submitted to the County as required under State law and/or the Marin County Code. (*Mitigation Measure R4.4-3d*)

d. The location of secondary use structures and critical facilities such as lifeline roads and utilities with respect to the top finished pit reclamation slopes shall be based on the results of the recommended detailed post-mining studies

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

127. The proposed reclamation grading and other earthwork activities included in the amended reclamation plan shall be designed such that all potential development areas would be located on either bedrock or consolidated engineered fill, with known and predictable strengths and stability. (*Mitigation Measure R4.4-3a*)

Water Quality

128. Within 6 months, the Permittee shall provide a Stormwater Management Plan and Stormwater Pollution Prevention Plan, both of which will be implemented as part of the projects. The Permittee shall include as part of the Stormwater Pollution Prevention Plan (SWPPP) and Stormwater Management Plan, a monitoring and maintenance element that would require scheduled periodic monitoring of BMP performance and condition. At a minimum, stormwater and erosion control BMPs shall be monitored after major storms, prior to the first rain event, and midway through large storm events extending over several days. Temporary BMPs (e.g., fiber rolls) shall be monitored for performance and immediately replaced if

necessary. Performance and failure of BMPs shall be described in the annual report to the RWQCB as required under the SWPPP. Monitoring and maintenance shall be conducted by an erosion control specialist contracted by the applicant. Monitoring and maintenance reports shall be filed with the Permittee and available to the County on request. (*Mitigation Measures R4.4-2a, R4.5-2a & R4.5-2b*)

129. Within one year of Permit approval, the Permittee shall submit an engineering and economic report for construction, operation and future maintenance of a mechanical mixing or aeration system, or another engineered approach, which will result in avoidance or elimination of a stratified water column within the Main Quarry Bowl after it is flooded. The report will be conducted by qualified limnologists and water quality engineers. The system design will be at a schematic level and will be stamped by a California professional engineer, and will include calculations that demonstrate that the system will maintain water quality objectives established in the San Francisco Bay Regional Water Quality Control Board's Basin Plan. The report will include an analysis of operating and maintenance costs for the system, as well as predicted energy requirements and greenhouse gas emissions, and a plan for minimizing both of these; estimate the funds needed to construct and operate in perpetuity the system to meet water quality objectives and what the financial assurance amount should be for the reclamation plan financial assurances; and will identify funding sources to ensure continued operation of the system after reclamation. The need for, and design of a mechanical mixing or aeration system shall be subject to further study and review as part of the post reclamation development plan, which shall be submitted at least three years prior to cessation of mining. (*Mitigation Measure R4.3-7, R4.5-6*)

130. Prior to implementation of the last phase of reclamation (Phase 4), the Permittee shall model effects of the maximum expected tsunami, seiche event, and anticipated sea level rise, considering the latest climate change information, and county policies and regulations in effect at the time, and proposed adequate setback and final contour elevations in a report to the County. If changes to the approved reclamation plan are needed, a revised Phase 4 reclamation plan shall be submitted to the County for review and approval prior to implementation. (*Mitigation Measure R4.5-8*)

131. The Permittee shall submit a revised amended reclamation plan that includes standards for preventing polluted stormwater runoff from entering the Main Quarry Bowl after it is flooded. The standards will be used to guide development of the post reclamation Development Plan, due to be submitted three years prior to the anticipated completion of mining. (*Mitigation Measure R4.5-10*)

132. Permittee shall abide by all standards and monitoring requirements of its State of California Regional Water Quality Control Board (RWQCB) discharge permit, including monitoring by a State of California certified sampling laboratory of all specified constituents and subsequent correction of any problems indicated by sampling results in excess of specified water quality standards; or any subsequent

requirements of the Regional Water Quality Control Board that may be implemented to augment or supersede the requirements.

133. The Permittee shall maintain all erosion control measures and keep current and comply with all permits required by the RWQCB. Copies of all RWQCB permits for the Quarry property shall be provided to the Department of Public Works.

Revegetation

134. Within 60 days of Permit approval, Permittee shall revise the amended reclamation plan (ARP04) to incorporate the State Office of Mine Reclamation (OMR) "Resoiling and Revegetation" comments contained in OMR's December 14, 2009 comment letter to the County. The revisions shall be included in the Conforming Amended Reclamation Plan submitted to the County.

135. In areas to be reclaimed by secondary development uses, temporary Type I, II, or III vegetation shall be installed as soon as reclamation grading is complete.

Hazardous Materials/ Public Health

136. Permittee shall maintain and periodically updated a Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan. (*Mitigation Measure R4.8-1a, R4.8-1b, & P4.8-3a*)

137. The Permittee shall prepare and maintain a blasting plan that describes how the Quarry will consistently comply with applicable blasting regulations and standards of practice. The blasting plan will contain a complete description of clearing and guarding procedures; descriptions of how explosives will be safely transported, stored, and used at the site in accordance with applicable regulations; evacuation, security and fire prevention procedures; blasting equipment list, and procedures for notification of nearby receptors in the event of an accident or emergency involving explosives. The blasting plan shall incorporate the recommendations contained in the REVEY Associates, Inc. report in Appendix J of the Combine FEIR, Volume III: Appendices (pp. 23-24). The blasting plan shall be prepared and submitted within six months of approval of the Permit. The plan will be subject to review and approval by the County Department of Public Works. (*Mitigation Measure P4.8-3b*)

138. A potable water supply and adequate toilet facilities shall be provided for employees according to requirements of the Marin County Environmental Health Division.

139. *Reporting Accidents:* The Permittee shall immediately notify the Public Works Director by telephone, FAX, and/or voice mail of any incidents such as fires, explosions, spills, land or slope failures, or other conditions at the site, which could pose a hazard to life or property outside the Permit or Quarry area. Upon request of any County agency, the Permittee shall provide a written report of any incident within

seven calendar days, which shall include, but not be limited to, a description of the facts of the incidents, the corrective measures used, and the steps taken to prevent a recurrence of the incident. This condition does not supersede nor replace any requirement of any other governmental entity for reporting incidents.

Cultural Resources

140. In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during quarrying, site preparation, construction, or reclamation activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Community Development Agency Director. (*Mitigation Measures R4.12-1a, & P4.12-9*)

141. The following applies to the last Phase of reclamation (Phase 4). The Permittee shall retain the services of a qualified archaeological consultant who has expertise in California prehistory to review reclamation grading plans and identify areas of potential concern, including previously undisturbed or minimally disturbed areas. The archeological consultant shall monitor all ground-disturbing or vegetation removal activities in identified areas of concern during mining or construction to ensure that any previously undiscovered cultural resources are properly identified and preserved or otherwise mitigated in accordance with prevailing professional standards and Public Resources Code §21083.2. If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit will cease. The archaeological monitor will be empowered to redirect crews and heavy equipment until the deposit is evaluated. The monitor will immediately notify the Marin County Department of Public Works of the encountered archaeological deposit. The monitor will, after making a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, present the findings of this assessment to Marin County. If Marin County, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, the Permittee shall take steps to:

- a. Redesign the project to avoid any adverse effects on the significant archaeological resource; or
- b. Develop and implement an archaeological data recovery program

(ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance and that interpretive use of the resource is feasible). If the circumstances warrant an archaeological data recovery program, an ADRP will be conducted that will preserve and recover important archeological data from the find, to the extent that adverse effects will be avoided. The project archaeologist will consult with Marin County to determine the scope of the ADRP. The archaeologist will prepare a draft ADRP that will be submitted to Marin County and the state Office of Historic Preservation for review and approval. The ADRP will identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP will identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods will not be applied to portions of the archaeological resources if nondestructive methods are practical. *(Mitigation Measure R4.12-1b)*

142. The Permittee shall relocate the top soil stockpile fill area "F" under Phase 1 of the proposed project, to avoid potentially adverse effects to the Caretaker's Residence. The fill area could be relocated either to the east or to the west of this potentially eligible historic resource, or split into two smaller stockpiles, to avoid the resource. *(Mitigation Measures R4.12-3a & R4.12-5b)*

143. Prior to commencement of Phase 1 reclamation grading, the Permittee shall submit a detailed plan to the Marin County Department of Public Works detailing stockpiles and haul routes, and protection of historic resources. The plan will clearly show how the Caretaker's Residence and other potentially eligible historic resources will be protected and preserved. *(Mitigation Measures R4.12-3b & R4.12-5b)*

144. The Permittee shall relocate and/or redesign the surcharge berm proposed under Phase 2 of the proposed project, to avoid potentially adverse impacts to the Boarding House and Office structures. The north-south leg of the berm could be narrowed to avoid these resources, allowing more fill to occur on the east-west portion of the berm. To ensure adherence to this mitigation measure, prior to commencement of Phase 2 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing the precise location of the surcharge berm, as well as areas that will be used to support construction of the berm. The plan will clearly show how the Boarding House and Office structures and other potentially eligible historic resources will be protected and preserved. *(Mitigation Measures R4.12-4a, & R4.12-5b)*

145. If relocation or alteration of the surcharge berm will affect the geotechnical properties of the site required for intended post-reclamation development, the

Permittee shall revise the conceptual design for the NW Quadrant Reclamation Plan accordingly. *(Mitigation Measure R4.12-4b)*

146. The Permittee shall redesign the reclamation activities in the SW and NW Quadrants under Phase 3 of the proposed project to avoid potentially adverse impacts to the former c. 1935 U.S. Army Signal House. The southernmost limits of the reclamation activity area could be reduced by approximately 100 feet to avoid this historic resource, potentially allowing more reclamation activities to occur on the northern, eastern, or western portions of SW-3. *(Mitigation Measures R4.1-1b, R4.1-2, & R4.12-5a)*

147. Prior to commencement of Phase 3 reclamation grading, the Permittee shall submit a detailed plan to the Marin County Department of Public Works detailing reclamation grading activities. The plan will clearly show and describe how the affected potentially historic resources, including the c 1935 U.S. Army Signal House, the Caretaker's residence, and the McNear's Brickyard Boarding House and Office structures, as well as any other potentially eligible historic resources will be protected and preserved. *(Mitigation Measure R4.12-5c)*

148. The Permittee shall revise the applicable portion of ARP04 to specify preservation of the following four historic resources: 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4) c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. The neighborhood commercial uses proposed for the NW Quadrant shall be constructed to provide a sufficient setback to allow these structures to visually 'read' as a working brickyard, with all original components of the brickmaking industry intact. *(Mitigation Measures R4.1-1a, R4.1-2, R4.1-1b, R4.12-6a, & R4.12-6b)*

Quarry Monitoring and Reporting

149. Within 60 days of Permit approval, the Permittee shall provide, in a form approved by the Public Works Director, three (3) copies, in binders, of all Exhibits to this Permit, and a mitigation, monitoring and reporting program plan to implement all required mitigation and monitoring programs and studies. In addition, the binders shall include all permits issued by or applied for from any other agencies.

150. Within 30 days of Permit approval, the Permittee shall contact the California Department of Mines and Geology, Office of Mine Reclamation, to determine what additional information is required by that agency given the County's approval of the project. The requested information shall then be provided in a timely manner with a copy to the County.

151. *Annual Report:* The Permittee shall furnish the Director of Public Works with an annual report by February 1st of each year describing how all conditions and mitigation measures of this permit are being implemented, any problems with such implementation and the resolution of such problems compliance with these conditions.

- a. With each report, the Permittee shall provide a topographic map at the same scale as the approved mining and reclamation plans, and if a different scale, a topographic map 1 inch to 200 feet.
- b. With each report the Permittee shall also provide an annotated map showing current progress of mining and reclamation and with information on drainage, erosion and sedimentation control facilities installed, and 'as-built' plans of revegetation areas.
- c. The report shall summarize air quality, noise, and biological monitoring data that has been collected over the preceding year.
- d. The report shall document conformance with the adopted Mitigation, Monitoring and Reporting Program (MMRP).
- e. The report shall specify planned biological surveys, reports, protective measures or mitigation that the Permittee intends to undertake in the upcoming year.
- f. The report shall contain information prescribed elsewhere in these permit conditions.
- g. The Permittee shall certify the accuracy of this report.

152. Permittee shall consult with the California Department of Fish and Game and US Fish and Wildlife Service in preparation of final mitigation plans for habitat preservation and enhancement. The methods, results, and recommendations of the field surveys shall be approved by the Public Works Director, and successful implementation shall be completed by the Permittee prior to site disturbance, or prior to final reclamation, as the case may be. Monitoring shall be performed by a qualified third party professional, who shall submit a report as part of the Permittee's Annual Report.

153. Permittee shall maintain a public web site where information and notices regarding this Permit, applicable condition noticing and the Permittee's operations will be posted as applicable.

154. Upon reasonable notice, Permittee hereby authorizes the County, or its designee, to enter and inspect the Quarry site for compliance with these permit conditions and/or the Marin County Code.

County and Consultant Work, Compliance Monitoring and Enforcement

155. Annual inspection, review of reports or plans required under these Permit conditions or approval, monitoring and enforcement costs, and fees shall be paid by the Permittee in order to cover all actual costs incurred by the County, including but

not limited to materials, staff time and consultant costs, for the inspection, monitoring and enforcement of the applicable Permit conditions and reclamation plan inspections. Where monitoring service of a qualified professional is required or needed by the County, additional monitoring fees may be levied on the Permittee to cover such costs. The County may request advance deposits prior to starting the work.

a. Within 45 days of Permit approval, Permittee shall deposit \$100,000 in a deposit account for monitoring. Said deposit will be used by County agencies to cover staff costs and/or County-initiated consultant contracts associated with these Permit conditions. As funds are drawn down the County may request additional funds in order to maintain an adequate fund balance. Standard accounting practices shall be employed by the County to account for the funds.

b. All phases of operations and reclamation shall conform with the adopted Mitigation, Monitoring and Reporting Program (MMRP), and the County of Marin will verify compliance with each of the required mitigation. Pursuant to the MMRP, the Permittee shall bear all cost associated with the management of the MMRP, including direct County staff costs. In the event County staff cannot absorb the task of managing the MMRP, an independent contractor will be hired by the County at the expense of the Permittee to carry out the responsibilities for managing the MMRP.

156. The County retains the right to hire its own consultants to evaluate any work undertaken by the Quarry or Quarry consultants under contract with the Quarry. Prior to the County engaging any independent consultants or contractors which will be paid for by the Permittee pursuant to the conditions of this Permit, the County shall confer with the Permittee regarding the scope and necessity of the work to be contracted for, as well as the costs of such work. County staff shall prepare a detailed proposed scope of work for services proposed to be provided by any consultant. These proposed contracts and scopes of work shall be provided to Permittee prior to retaining any consultant. The Permittee shall have the opportunity to review and comment on all such consultant contracts. Any decisions made by County staff may be appealed to the Board of Supervisors per the appeal procedures contained in the Marin County Ordinance Code then in effect.

Permit or Monitoring Modifications

157. Prior to undertaking any operational or construction related activity which is not expressly described in these conditions or approved Conformation Amended Reclamation Plan, the Permittee shall contact the Department of Public Works to determine if such activity requires a modification of this Permit.

a. The Public Works Director may, at his/her discretion, require that the Permittee file a written description of the proposed activity prior to rendering a decision whether a permit or monitoring modification is required. If a permit

or monitoring modification is required, such modification shall be subject to the then applicable standards for permit modification in the Marin County Code and the environmental review required by CEQA. Such permit or monitoring modifications shall be accompanied by a fee to process the request and reimburse the County staff time, as determined by the Public Works Director.

158. The Public Works Director may in his/her discretion extend the time limits for compliance with permit conditions if the Permittee demonstrates that it has diligently attempted to meet the deadline specified. The monitoring programs and plans submittals required by the Permit conditions herein may also be reasonably modified at the discretion of the Public Works Director after consultation with the resource agency with applicable expertise.

159. The County and all other permitting agencies shall have the option of referring any and all subsequent permit modification application requests of the Permittee to an independent and qualified consultant for review and evaluation of issues beyond the expertise or manpower of staff. The costs for all such consultant work shall be borne by the Permittee and are independent of the fees paid for staff processing of a permit application or review.

Community Relations

160. At least twice annually, or more frequently as determined by the Public Works Director, the Permittee shall hold a local community forum to review and discuss Quarry operations and reclamation, and answer questions from the public in attendance. The meeting announcement shall be made at least 30 days in advance of the meeting and posted on a web site, provided to the Public Works Director, and provided to local community organizations.

Mining Operation or Reclamation Not in Compliance with Permit

161. If the Director of Public Works determines, based upon an inspection or otherwise confirmed by credible evidence, that the surface mining operation or reclamation activity is not in compliance with this Permit, approved reclamation plan, County of Marin Code or State law, the Director may notify the Permittee of that violation by personal service or certified mail. If the violation extends beyond 5 days after the date of the Director's notification, the Director may issue an order by personal service or certified mail requiring the Permittee to comply with this Permit, County of Marin Code or State law.

a. Any order issued under this section shall specify which aspects of the surface mine's activities, operations or reclamation are inconsistent with this Permit, County of Marin Code or State law, shall specify a time for compliance which the Director determines is reasonable, taking into account the seriousness of the violation and any good faith efforts to comply with applicable requirements.

b. If the Permittee violates or fails to comply with an order issued under this section after the order's effective date, the Permittee shall be subject to an order of the Director imposing an administrative penalty of not more than five thousand dollars (\$5,000) per day, per violation, assessed from the original date of noncompliance with this Permit, County of Marin Code or State law. The penalty may be imposed administratively by the Director.

c. In determining the amount of the administrative penalty, Director shall take into consideration the nature, circumstances, extent, and gravity of the violation or violations, any prior history of violations, the degree of culpability, economic savings, if any, resulting from the violation, and any other matters justice may require.

d. Orders setting administrative penalties shall become a final order and effective upon issuance thereof and payment shall be made to the County of Marin within 30 days, unless the Permittee appeals to the Board of Supervisors for review.

e. Within 15 days of the issuance of an order or orders setting administrative penalties the Permittee may appeal to the Board of Supervisors for review of the order(s). If no appeal is requested from the Director of Public Works Order(s), such shall be deemed a failure to exhaust administrative remedies and a waiver of any further administrative and legal rights.

f. If an appeal is requested, the Board of Supervisors may, after hearing the appeal, affirm, modify, or set aside, in whole or in part, by its own order, any order of the Director of Public Works.

g. The Permittee aggrieved by a final order of the Board of Supervisors may obtain review of the order by filing in the superior court a petition for writ of mandate within the statutory time following the issuance of the final order. If the Permittee does not petition for a writ of mandate within the statutory time limits, a final order of the Board of Supervisors shall not be subject to review by any Court or Agency.

h. The remedies and civil penalties provided by this section shall be in addition to any other remedies and penalties provided by law.

162. A current set of Permit conditions, approved reclamation plan and associated exhibits and reports shall be retained at the Quarry site.

Revocation (ref. MCC 23.06.070)

163. In the event any Permittee holding a permit hereunder fails, neglects or refuses to fulfill any of the requirements or any of the conditions of the permit or violates any other applicable law or ordinance, or conducts or carries on the

operation in such a manner as to materially affect adversely the health welfare or safety of persons residing or working in the neighborhood of the property wherein the operations is being conducted, or conducts or carries on an operation so that it is materially detrimental to the public welfare or injurious to property or improvements in the neighborhood, the Director of Public Works may revoke or suspend the permit. No permit shall be revoked or suspended until a hearing is held by the Board of Supervisors.

Correspondence from Other Agencies/Jurisdictions

164. Copies of all violations or abatement notices, or requests for reports or information related to this Permit and its authorized uses by federal, state or local jurisdictions/agencies, shall be provided to the Public Works Director within 30 days of the Permittee's receipt of said notices or requests. Within 30 days of any subsequent modification of another agency's permit or submission of an application for any permit to another agency, the applicable materials shall be submitted to the Public Works Director.

Change of Ownership Notice

165. Permittee, property owner and their authorized agents, and any other person in control of the property, individually or collectively, are responsible for the observation and compliance with all the provisions of this permit and the Marin County Surface Mining Ordinance. Said responsibility shall run with the land under permit as a covenant. Successive owners, heirs, and assigns of this real property are bound to comply with all the requirements of these conditions. Prior to any lease, sale, transfer, or conveyance of any portion of the real property that is the subject of the Quarry, the owner shall provide a copy of the adopted conditions to the prospective lessee, buyer, transferee, or one to whom the conveyance is made.

166. At least 10 calendar days prior to the effective date of change of property ownership, or of lessee(s), or operator(s) of the permitted use, there shall be filed, as an initial notice with the Public Works Director, the name(s), address(es), and telephone/FAX number(s) of the new owner(s), lessee(s) or operator(s), and company officer(s). A final statement that a transfer of ownership has occurred shall be provided to the Public Works Director within 15 calendar days of said transfer. Said statement shall include any changes in name(s), address(es), and telephone/FAX number(s) of the new owner(s), lessee(s), or operator(s), and company officer(s) from the initial notice. Said statement shall be accompanied by a letter from the new property owner(s), lessee(s), and/or operator(s) acknowledging and agreeing to comply with all conditions of this Permit. Said statement shall specify the effective date and time of the transfer.

Severability

167. If any of the conditions of this permit are held to be invalid, that holding shall not invalidate any of the remaining conditions or limitations set forth.

168. If any condition(s) is invalidated by a court of law, and said invalidation would change the findings and/or mitigation measures associated with the approval of this Permit, the project may be reviewed, at the discretion of the Board of Supervisors, and substitute feasible condition(s)/mitigation measures may be imposed to adequately address the subject matter of the invalidated condition(s).

Permittee Defense Costs

169. As a condition of permit issuance and use of this permit, including adjustment, modification or renewal of the permit, the Permittee agrees to:

- a. Defend, at the Permittee's sole expense, any action brought against the County by a third party challenging either its decision to issue this Permit or the manner in which the County is interpreting or enforcing the conditions of the Permit; and
- b. Indemnify the County against any settlements, awards, or judgments, including attorney's fees, arising out of or resulting from any such action.

170. Upon demand from the County, the Permittee shall reimburse the County for any court costs and or attorney's fees which the County may be required by a court to pay as a result of any such action the Permittee defended or of which it had control of the defense. The County may, at its sole discretion, participate in the defense of any such action, but such participation shall not relive the Permittee of its obligations under this condition.

Duty to Defend & Indemnity

171. As a condition of permit issuance and use of this permit, including adjustment, modification or renewal of the permit, the Permittee agrees to defend, indemnify and hold harmless the County, its agents, officers and employees, from any claim, action or proceeding against the County, to challenge any portions of the EIR certification, permit or reclamation plan process or approval; In addition to damages, indemnification includes reimbursing the County for staff and consultants cost, court costs, and attorney's fees (including claims for private Attorney General fees).

172. Neither the issuance of a permit hereunder nor compliance with the conditions thereof shall relieve the Permittee from any responsibility otherwise imposed by law for damage to persons or property, nor shall the issuance of any permit hereunder serve to impose any liability upon the County of Marin, its officers or employees for injury or damage to persons or property.

EXHIBIT 3
SAN RAFAEL ROCK QUARRY ARP AND AQP
MITIGATION MONITORING AND REPORTING PROGRAM

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Aesthetics				
<p>R4.1-1: Visual impacts on the view from Vantage Point 3, the public walkway and public road southwest of the site.</p>	<p>R4.1-1a: Implementation of Mitigation Measure R4.12-6a, retention of Hoffman Kiln #1 and its stack would partly mitigate this impact.</p> <p>R4.1-1b: Implementation of Mitigation Measures R4.12-3a, 3b, 4a, 4b, 5a, 5b, 5c, 6a, and 6b to ensure that key historic structures are preserved, would also mitigate the adverse visual impacts that would result from the loss of these structures.</p>	<p>R4.1-1: SRRQ to submit revised amended reclamation plan. The Marin County DPW will verify SRRQ's compliance with Mitigation Measures R4.1-1a and R4.1-1b. See also Mitigation Monitoring Measures R4.12-3, 4, 5, and 6.</p>	<p>Specification for preservation of historic structures to be included with Conforming Amended Reclamation Plan, to be submitted within 60 days of AQP approval. Detailed grading plans for Reclamation Phases III and IV to be submitted with grading permit applications. See referenced Mitigation Measures.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and specified plans. See referenced Mitigation Measures.</p>
<p>R4.1-2: Visual impacts on the view from Vantage Point 5, Via Montebello near San Marino Drive in the Peacock Gap Neighborhood.</p>	<p>See Mitigation Measure R4.1-1a.</p>	<p>See Mitigation Monitoring Measure R4.1-1.</p>	<p>See above.</p>	<p>See above.</p>
<p>P4.1-9: Proposed nighttime operations would introduce new sources of light and glare.</p>	<p>P4.1-9: The AQP will restrict operations that have the potential to cause nighttime sources of light and glare and that are visible from public vantage points (including the Bay and vantage points across the Bay), roadways, and residences to daytime hours, except during emergency operations. See Mitigation Measure 4.6-6b in Section 4.6, Land Use and Planning.</p>	<p>P4.1-9: The Marin County DPW will verify SRRQ's compliance with Mitigation Measure P4.1-9. See also Mitigation Monitoring Measure 4.6-6 in Section 4.6, Land Use and Planning.</p>	<p>Upon issuance of the AQP.</p>	<p>Verified by Marin County DPW continuous program of periodic inspections of SRRQ activity, and reported by SRRQ in annual report of quarry operations and reclamation.</p>
Air Quality				
<p>R4.2-1: Reclamation grading under Phases 1-3 of the proposed Amended Reclamation Plan would result in an increase in daily emissions of criteria air pollutants above emissions that would have occurred under the 1982 Amended Reclamation Plan. This increase in daily emissions would exceed the Bay Area Air Quality Management District-established significance thresholds for nitrogen oxides and particulate matter equal to or less than 10 microns.</p>	<p>R4.2-1a: The project applicant has recently initiated the use of biodiesel fuel in all quarry rolling stock. Biodiesel is the only alternative fuel for which a detailed emissions evaluation has been submitted to the United States Environmental Protection Agency (USEPA). The effectiveness of emission reduction resulting from the use of biodiesel is dependant upon the percent of biodiesel contained in the mixture (USEPA, 2002). The most common blend, and that currently used at SRRQ, is a 20 percent biodiesel and 80 percent conventional diesel (B-20). B-20 will reduce particulate and CO emission by approximately 12 percent, and reduce hydrocarbon emissions by approximately 20 percent. Use of biodiesel may increase or decrease NOx emissions (McCormick et al, 2006).</p>	<p>R4.2-1: SRRQ shall implement all mitigation measures as requirements of the AQP conditions of approval. The Marin County DPW will be responsible for monitoring implementation of all Impact R4.2-1 mitigation measures.</p>	<p>Upon approval of Conforming ARP, to be submitted within 60 days of AQP approval, the requirement shall become part of the ARP. Alternative fuel usage shall begin when reclamation activity begins.</p>	<p>Verified by Marin County DPW continuous program of periodic inspections of SRRQ activity, and reported by SRRQ in annual report of quarry operations and reclamation. Emission reduction measures and compliance with emission CAP to be verified by Marin County DPW, and reported by SRRQ in</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Air Quality (cont.)</p> <p>R4.2-1 (cont.)</p>	<p>R4.2-1b: SRRQ has already upgraded SRRQ's entire fleet of off-road diesel equipment to USEPA Tier 3 standards, ahead of regulatory requirements that at least 10 percent of the fleet be upgraded each year. SRRQ also plans to upgrade its tug boat fleet to Tier 2 standards prior to the end of 2008.</p> <p>R4.2-1c: SRRQ already implements several measures to control dust. These will be continued under the project:</p> <ul style="list-style-type: none"> • All trucks leaving the Quarry shall be washed down, including the undercarriage, prior to entering Point San Pedro Road (except trucks transporting asphalt). The wash down and adjoining areas shall be paved to minimize tracking of dust and dirt. Point San Pedro Road will be swept up to two times per day, except on rainy days, when no sweeping will occur, subject to the approval of the City of San Rafael; • The Quarry shall maintain all required erosion control measures and stormwater management plans, and shall keep current and comply with all permits required by the Regional Water Quality Control Board; • The Quarry shall maintain all dust abatement devices, and shall keep current and comply with all permits required by the BAAQMD. <p>R4.2-1d: The project sponsor shall be required to continue existing emission reduction practices, including use of alternative fuels, use of low-emission diesel equipment, and dust abatement measures.</p> <p>R4.2-1e: The applicant shall implement additional dust abatement measures identified by BAAQMD as feasible dust control, during all reclamation grading activities:</p> <ul style="list-style-type: none"> • Cover all trucks hauling soil, sand, and other loose materials as a part of reclamation activities, or require such trucks to maintain at least two feet of freeboard between the top of the material and top of truck; • Pave, apply water at a minimum three times daily in dry weather, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas at the Quarry; 			<p>annual report of quarry operations and reclamation. The BAAQMD is the administrator of the emissions credit program, and will be responsible for ensuring compliance with the terms of participation in this program.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Air Quality (cont.) R4.2-1 (cont.)	<ul style="list-style-type: none"> • Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at the Quarry; • Hydroseed, apply non-toxic soil stabilizers, or water to inactive reclamation areas (previously graded areas inactive for ten days or more); • Limit traffic speeds on unpaved roads to 15 miles per hour; • Install sandbags or other erosion control measures to prevent silt runoff to public roadways; • Replant vegetation in disturbed areas as soon as the growing seasons dictates; • Install wind breaks or plant trees/vegetative wind breaks at the windward sides of the reclamation areas until such time as the vegetation is established; • Suspend reclamation-related excavation and grading activities when wind (as instantaneous gusts) exceeds 25 miles per hour; and • Limit the area subject to reclamation-related excavation, grading and other construction activity at any one time. <p>R4.2-1f: The project applicant shall keep all off-road equipment well-tuned and regularly serviced to minimize exhaust emissions, and shall establish a regular and frequent check-up and service/maintenance program for all operating equipment at the Quarry.</p> <p>R4.2-1g: To further reduce emissions from off-road diesel equipment, the applicant shall fuel on-site diesel-powered mobile equipment used in reclamation activities with a minimum 80 percent biodiesel blend (B-80) or use other equipment and/or fuel that achieves the same reduction in particulate (PM-10) emissions. The applicant shall also use Purinox[™], another approved additive, or other measures to reduce NOx and PM-10 emissions to the maximum extent feasible given current technologies.</p> <p>R4.2-1h: Off-road diesel equipment operators shall be required to shut down their engines rather than idle for more than 5 minutes, unless such idling is necessary for proper operation of the vehicle.</p>			

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Air Quality (cont.)				
R4.2-1 (cont.)	<p>R4.2-1i: If the mitigation measures listed above do not reduce emissions to below threshold values, the applicant will acquire BAAQMD off-site emission offset credits in sufficient quantity to reduce emissions from reclamation grading to levels below significance thresholds.</p> <p>R4.2-1j: The applicant will limit on-site mining operations on days on which reclamation grading activities are performed, such that total emissions from the site are not increased above significance thresholds. To ensure the effectiveness of this measure, the Quarry will be required to maintain and report to the BAAQMD and the County Public Works Department a record of reclamation and operations activities, with an estimate of emissions from each. The baseline for combined emissions is the current level of emissions for mining operations, as shown in Table 4.2-13.1, plus the baseline emissions for the reclamation grading phase, as shown in Tables 4.2-10 and 4.2-11. The limit for combined emissions from mining and reclamation will therefore be the sum of the current emissions levels from mining operations, the baseline emission levels for reclamation grading, and the BAAQMD's threshold values for criteria pollutants, as shown in Table 4.2-10.1 for each reclamation phase.</p>	<p>The BAAQMD is the administrator of the emissions credit program and will be responsible for ensuring compliance with the terms of participation in this program.</p> <p>The BAAQMD is the administrator of the emissions credit program and will be responsible for ensuring compliance with the terms of participation in this program</p>	<p>Implementation of emission credits will be on an as-needed basis.</p> <p>As above.</p>	<p>Emission reduction measures and compliance with emission cap to be verified by Marin County DPW, and reported by SRRQ in annual report of quarry operations and reclamation. The BAAQMD is the administrator of the emissions credit program, and will be responsible for ensuring compliance with the terms of participation in this program.</p> <p>As above.</p>
R4.2-2: Phase 4 of the 2004 Amended Reclamation Plan would include cut and fill activities that were not included in 1982 Amended Reclamation Plan. These new reclamation activities would result in emissions of criteria pollutants that would exceed BAAQMD significance thresholds.	<p>R4.2-2a: Mitigation measures R4.2-1a, b, and c apply to Phase 4 as well.</p> <p>R4.2-2b: Implement Mitigation Measures R4.2-1d through R4.2-1j for Phase 4.</p>	<p>R4.2-2: The Marin County Public Works Department will be responsible for monitoring implementation of all mitigation measures.</p>	<p>Upon commencement of Phase 4 reclamation.</p>	<p>Emission reduction measures and compliance with emission CAP to be verified by Marin County DPW, and reported by SRRQ in annual report of quarry operations and</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Air Quality (cont.)</p>	<p>R4.2-3a: The applicant already uses a 20 percent biodiesel blend (B-20) in on-site mobile equipment; see Mitigation Measure R4.2-1a. The CO₂ produced by burning biodiesel is considered "biogenic," that is, it is part of the natural cycling of carbon in the atmosphere and biosphere. Because it is not from a fossil source, it is not included in GHG inventories. Therefore, the use of B-20 reduces CO₂ emissions that contribute to global climate change from on-site mobile equipment by approximately 20 percent.</p> <p>R4.2-3b: Implementation of Mitigation Measure R4.2-1d, f, g, and h will reduce running time of diesel equipment, replace diesel equipment with less polluting equipment, and increase the use of biodiesel in on-site equipment. The amount of reduction in GHG emissions is estimated to be approximately an additional 65 percent.</p> <p>R4.2-3c: Within one year of project approval, the applicant shall prepare and implement a GHG reduction plan. The plan will include a complete inventory of reclamation-related GHG emissions and will demonstrate how the Quarry will reduce or offset remaining un-mitigated GHG emissions. The plan will prioritize emission reduction through energy conservation and other measures; for those emissions that cannot be reduced, the plan shall specify how emissions will be offset. Offsets may take the form of installation of on-site alternative energy generation facilities (such as solar power) or off-site compensation, such as monetary contribution to a project that sequesters carbon. Examples of such projects include wetland restoration, purchase of carbon credits verified by the California Climate Action Registry, and reforestation. On-site offsets will be given higher priority than off-site offsets, and offsets with co-benefits, such as reduction of particulate</p>	<p>R4.2-3: In addition to Mitigation Monitoring Measure R4.2-1, the Marin County Public Works Department will be responsible for reviewing and approving the GHG reduction plan. The Marin County DPW will also be responsible for monitoring implementation of the GHG reduction plan.</p>	<p>Upon submittal of a Conforming Amended Reclamation Plan within 60 days of permit approval; ongoing monitoring of emission reduction measures. GHG reduction plan to be submitted within one year of AQP approval.</p>	<p>reclamation. The BAAQMD is the administrator of the emissions credit program, and will be responsible for ensuring compliance with the terms of participation in this program.</p> <p>Emissions reductions and adherence to GHG reduction plan to be reported annually by SRRQ in annual report of quarry operations and reclamation, and verified by Marin County DPW, beginning one year after permit approval.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Air Quality (cont.)				
R4.2-3 (cont.)	emissions within the vicinity of the Quarry, and restoration of habitat for special status species, will be given higher priority. The plan must demonstrate how, at a minimum, the Quarry will reduce reclamation-related, non-biogenic GHG emissions consistent with the Marin County Greenhouse Gas Reduction Plan and Countywide Plan Update policies; the plan must demonstrate how reclamation-related emissions are reduced or offset, such that total emissions are 15% below the emissions associated with ARP82, or no more than 2,489 tons of eCO ₂ . The plan will include an implementation schedule. The plan will be submitted to the Marin Public Works Department for review and approval. In addition, the initial emissions inventory prepared as part of the plan will be reported to the California Climate Action Registry or a successor organization as a baseline inventory, and the Quarry will conduct and report additional inventories annually.			
R4.2-5: The proposed Amended Reclamation Plan would result in post-reclamation development and land uses that will emit greenhouse gasses, and contribute to global climate change.	R4.2-5: The applicant shall revise the ARP to include a standard to guide the future design of the final Development Plan (due to be submitted to the County three years prior to the cessation of mining) to incorporate a detailed inventory of GHG emissions associated with the planned post-reclamation development, and a plan to reduce GHG emissions consistent with Countywide Plan policies and other relevant County, state and federal standards, as applicable.	R4.2-5: The Marin County DPW will review the revised ARP for completeness prior to project approval.	Upon submittal of a Conforming Amended Reclamation Plan within 60 days of permit approval; and as part of the Final Development Plan, to be submitted 3 years prior to the cessation of mining.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation plan, and, later, upon submittal of the Final Development Plan.
P4.2-6: Future Quarry operations under the proposed Amended Surface Mining and Quarrying Permit could exceed baseline levels of production, with concomitant increases in emissions of criteria air pollutants above threshold values.	P4.2-6a: Mitigation measures R4.2-1a, R4.2-1b, and R4.2-1c apply to equipment used in ongoing quarrying operations as well. P4.2-6b: Implement Mitigation Measures R4.2-1d through R4.2-1h for ongoing quarrying operations as well as reclamation activities. P4.2-6c: Implement Mitigation Measure P4.6-6b (see Section 4.6, Land Use and Planning), which would limit Quarry operations to the baseline level.	P4.2-6: The Marin County DPW will be responsible for oversight and enforcement of these provisions. DPW will verify that a revised application for the AQP that contains the above provisions, including the Operational Dust Mitigation Plan/Program, and will approve said provisions prior to issuance of the AQP. After issuance of the AQP, DPW will conduct routine field inspection to verify implementation of these provisions. The Quarry must report its annual production to the County and to the State each year.	Emission reduction requirements and cap on annual production to become conditions of approval of the AQP, and will be implemented upon AQP approval.	Verified by Marin County DPW, and reported by SRRQ in annual report of quarry operations and reclamation.

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Air Quality (cont.)</p> <p>P4.2-7: Proposed amendments to the Surface Mining and Quarrying Permit could result in an increase in greenhouse gas emissions, and contribute to global climate change.</p>	<p>P4.2-7a: The applicant proposes to limit truck trips into and out of the Quarry to 250 trips per day, which is below the baseline level of truck trips. Therefore, GHG emissions from haul trucks would not increase above 1990 levels.</p> <p>P4.2-7b: The applicant already uses a 20 percent biodiesel blend in on-site mobile equipment; see Mitigation Measure R4.2-1a. Biodiesel reduces CO2 emissions that contribute to global warming, since biodiesel is derived from plant and animal sources, not fossil sources.</p> <p>P4.2-7c: Mitigation Measure P4.2-6b will further reduce GHG emissions below 1990 levels from on-site mobile equipment used for Quarry operations.</p> <p>P4.2-7d: : Mitigation Measure P4.6-6b will limit production to baseline levels, which will ensure no increase in emissions from on-site mobile diesel equipment and tugboats.</p> <p>P4.2-7e: The Greenhouse Gas Reduction Plan specified in Mitigation Measure R4.2-3c shall also include an inventory of operations-related GHG emissions and a plan to reduce these emissions by 15 percent.</p>	<p>P4.2-7: See Mitigation Monitoring Measures R4.2-1, R4.2-3, P4.2-6 and P4.6-6.</p>	<p>See referenced mitigation measures.</p>	<p>See referenced mitigation measures.</p>
<p>C4.2-9: Reclamation activities under the Amended Reclamation Plan and Quarry operations under the Amended Surface Mining and Quarrying Permit would result in emissions of toxic air contaminants, including diesel particulate matter, increasing the risk of cancer for nearby sensitive receptors.</p>	<p>C4.2-9a: As noted in Mitigation Measures R4.2-1 and P4.2-6, the applicant has taken measures to reduce DPM emissions from on-site equipment, including upgrading to lower emission engines and use of B-20 fuel.</p> <p>C4.2-9b: Implement Mitigation Measure P4.6-6b, which would limit multi-year annual average production levels to 1982.</p> <p>C4.2-9c: Implement Mitigation Measure R4.2-1 and Mitigation Measure P4.2-6 to further reduce DPM emissions from on-site mobile equipment used both for reclamation and for mining operations.</p>	<p>C4.2-9: See Mitigation Monitoring Measures R4.2-1, P4.2-6, and P4.6-6.</p>	<p>See referenced mitigation measures.</p>	<p>See referenced mitigation measures.</p>
<p>C4.2-12: Toxic air contaminants emitted from past Quarry operations, in conjunction with planned future operations under the AQP (as well as currently unplanned but reasonably foreseeable future operations), reclamation activities under the Amended Reclamation Plan,</p>	<p>No additional mitigation is available to further reduce the cancer health risks from the current projects or from reasonably foreseeable future projects, beyond those stated in Mitigation Measures C4.2-9a, b, and c.</p>	<p>C4.2-10: See Mitigation Monitoring Measures R4.2-1, P4.2-6, and P4.6-6.</p>	<p>See referenced mitigation measures.</p>	<p>See referenced mitigation measures.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Air Quality (cont.)				
and post-reclamation land uses could cause significant cumulative health effects.				
C5-3: The project would add incrementally to cumulative air pollutant emissions.	Implement Mitigation Measures R4.2-1a through j and R4.2-2a and b.	C5-5: See Mitigation Monitoring Measures R4.2-1 and R4.2-2.	See referenced mitigation measures.	See referenced mitigation measures.
Biological Resources				
R4.3-2: Reclamation activities during Phases 1 through 4, as well as post-reclamation uses of the site will result in the loss of native vegetation at San Rafael Rock Quarry, including mixed perennial grassland, coastal scrub, and coast live oak woodlands.	R4.3-2a: ARP04 contains "Standards for Preserving Sensitive Habitat Areas." Implementation of these standards will protect specific areas of oak woodland and native grassland. R4.3-2b: The applicant shall submit to the Marin County Department of Public Works a revised ARP that includes the preservation of the small hill, consistent with ARP82. Any plans for future alteration of the small hill for post-reclamation development may be proposed as part of the final Development Plan, due to be submitted three years prior to the cessation of mining.	R4.3-2: The Marin County DPW shall be responsible for reviewing revisions to ARP04 prior to its adoption, and for monitoring compliance with standards contained therein.	Upon submittal of a Conforming Amended Reclamation Plan, within 60 days of permit approval, and throughout period of reclamation.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan, and ongoing during quarry operations and reclamation.
R4.3-3: Reclamation activities implemented in Phases 1 through 4 could result in temporary disturbance to or mortality of Point Reyes bird's beak and Gairdner's yampah.	R4.3-3a: ARP04 delineates areas to be preserved, including portions of South Hill, the Grassy Knoll, and the marsh areas. R4.3-3b: Prior to each reclamation phase and during the planning for post-reclamation development presence/absence surveys for special-status plants will be conducted by a qualified botanist within areas to be disturbed. <ul style="list-style-type: none">• Surveys will be conducted in accordance with CNPS and CDFG rare plant survey guidelines.• Surveys will be conducted prior to the start of each phase of reclamation activities, during the flowering period when the species is most readily identifiable (June – October).• The results of the surveys will be filed with the County, if the presence of any of these species is confirmed, a copy of the survey results will be forwarded to CDFG, and Mitigation Measure R4.3-3c will be implemented.• In the event that special-status plants are proven absent, then no additional mitigation is necessary.	R4.3-3a: The Marin County DPW shall be responsible for ensuring that special status plant surveys are conducted prior to planned disturbance, for ensuring implementation of Mitigation Measure R4.3-3 in the event that species presence is affirmed, and for making a final determination of success.	Prior to commencement of each reclamation phase and prior to submittal of Final Development Plan, and, if presence is affirmed, during reclamation.	Verified by Marin County DPW prior to issuance of grading permits for each reclamation phase, and as part of review of Final Development Plan.

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>R4.3-3 (cont.)</p> <p>R4.3-3c: In the event that special-status plant populations are found during the surveys conducted pursuant to Mitigation Measure R4.3-3b, the project proponent will avoid disturbance to the species by establishing a visible buffer zone of not less than 25 feet prior to construction or by relocating reclamation activities if feasible to avoid disturbance. Where necessary reclamation activities cannot be altered to avoid disturbance, the applicant shall relocate affected special-plant populations and/or restore similar habitat in another location:</p> <ul style="list-style-type: none"> • Protection of special status species will be coordinated by a qualified biologist. • Disturbance or mortality of special status plant habitat and species shall be avoided as a priority. If a qualified biologist determines that restoration would provide equivalent or more effective mitigation, special-status plant habitat and/or sensitive plant communities may instead be restored on-site at a 2:1 ratio in areas that are to remain as post-reclamation open space, such as the Grassy Knoll or within the salt marshes. • Special-status plants and/or seeds will be salvaged from areas of disturbance and moved to restoration areas on or off the site; if this is not feasible, an alternate source of seed or plant material will be selected by a qualified biologist. • A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards will include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and a functioning, self-sustaining plant community at the end of five years. <p>R4.3-4: Reclamation activities implemented in Phases 1 through 4, as well as post-reclamation development could result in damage to or removal of protected trees that are within or adjacent to areas to be reclaimed or developed.</p>	<p>R4.3-3c: In the event that special-status plant populations are found during the surveys conducted pursuant to Mitigation Measure R4.3-3b, the project proponent will avoid disturbance to the species by establishing a visible buffer zone of not less than 25 feet prior to construction or by relocating reclamation activities if feasible to avoid disturbance. Where necessary reclamation activities cannot be altered to avoid disturbance, the applicant shall relocate affected special-plant populations and/or restore similar habitat in another location:</p> <ul style="list-style-type: none"> • Protection of special status species will be coordinated by a qualified biologist. • Disturbance or mortality of special status plant habitat and species shall be avoided as a priority. If a qualified biologist determines that restoration would provide equivalent or more effective mitigation, special-status plant habitat and/or sensitive plant communities may instead be restored on-site at a 2:1 ratio in areas that are to remain as post-reclamation open space, such as the Grassy Knoll or within the salt marshes. • Special-status plants and/or seeds will be salvaged from areas of disturbance and moved to restoration areas on or off the site; if this is not feasible, an alternate source of seed or plant material will be selected by a qualified biologist. • A five-year restoration mitigation and monitoring program will be developed and implemented. Appropriate performance standards will include, but are not limited to: a 75 percent survival rate of restoration plantings or plant cover; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and a functioning, self-sustaining plant community at the end of five years. <p>R4.3-4a: ARP04 delineates areas to be preserved, including portions of South Hill and the Grassy Knoll.</p>	<p>R4.3-3b: In the event that special-status plants are trans-located or that habitat for them is restored, Annual Mitigation and Monitoring reports will be prepared and submitted to California Department of Fish and Game.</p>	<p>As needed.</p>	<p>Verified by Marin County DPW during translocation, and annually thereafter.</p>
<p>R4.3-4: Reclamation activities implemented in Phases 1 through 4, as well as post-reclamation development could result in damage to or removal of protected trees that are within or adjacent to areas to be reclaimed or developed.</p>	<p>R4.3-4a: ARP04 delineates areas to be preserved, including portions of South Hill and the Grassy Knoll.</p>	<p>R4.3-4: Marin County DPW shall be responsible for ensuring that the specified actions are undertaken prior to planned disturbance, and for ensuring implementation of Mitigation Measure R4.3-4e.</p>	<p>Prior to commencement of each reclamation phase and prior to any disturbance of areas where protected trees are growing.</p>	<p>Verified by Marin County DPW prior to issuance of grading permits for each reclamation phase, and during site inspections thereafter.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>R4.3-4 (cont.) Biological Resources (cont.)</p>	<p>R4.3-4b: Implement Mitigation Measure 4.3-2b to protect the trees located on the small hill in the NW Quadrant.</p> <p>R4.3-4c: The applicant will implement the following measures in order to minimize damage to protected trees that are to be preserved on-site:</p> <ul style="list-style-type: none"> • Prior to the start of any clearing, stockpiling, excavation, grading, compaction, paving, change in ground elevation, or construction, preserved trees that occur adjacent to project construction areas shall be identified as preserved and clearly delineated by constructing short post and plank walls, or other protective fencing material, at the dripline of each tree. • The delineation markers shall remain in place for the duration of the work. • Where reclamation activities would encroach upon the dripline of a preserved tree, special construction techniques will be required to allow the roots of remaining trees within the project site to breathe and obtain water (examples include, but are not limited to, use of hand equipment for tunnels and trenching, and/or allowance of only one pass through a tree's dripline). Tree wells or other techniques may be used. • The following shall not occur within the dripline of any retained tree: parking; storage of vehicles, equipment, machinery, stockpiles of excavated soils, or construction materials; or dumping of oils or chemicals. • If a tree within a preserved area is damaged or destroyed, the applicant shall replace the tree at a ratio of 2:1 with trees of the same species. Tree replacement shall be performed by a certified arborist. <p>R4.3-4d: All pruning activities of preserved trees shall be performed by a certified arborist. No more than 25 percent of a tree's canopy shall be removed during pruning activities of retained trees.</p> <p>R4.3-4e: The project proponent shall develop and implement a five-year monitoring program for any required replacement plantings, as specified in Mitigation Measure R4.3-4c.</p>	<p>See also Mitigation Monitoring Measure R4.3-2.</p>		

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.)				
R4.3-4 (cont.)	Performance standards for tree replacement include all of the following: 75 percent survival rate of restoration plantings; absence of invasive plant species (any species listed on the California Invasive Plant Council's California Invasive Plant Inventory); and self-sustaining trees at the end of five years. If these criteria are not met, the applicant shall re-plant and success shall again be assessed after five years.			
R4.3-5: Reclamation activities as well as post-reclamation development could result in substantial adverse effects on wetlands and waters of the U.S. under the jurisdiction of the Army Corps of Engineers, waters of the State under the jurisdiction of California Department of Fish and Game or the Regional Water Quality Control Board, and waters and land under Bay Conservation and Development Commission and State Lands Commission jurisdiction, and would be inconsistent with standards established for the Baylands Corridor in the Countywide Plan update.	R4.3-5a: ARP04 contains standards for setbacks from marsh areas. As stated in Chapter 3, Project Description, the saltwater and brackish marsh areas in the NW Quadrant would be protected by maintaining a setback from the edge of the existing marsh, maintaining high quality stormwater runoff, and keeping the outlet works of the marsh in good working order. ARP04 further states that stormwater quality would be monitored, and that the setback would align with the edge of current operations, including the edge of existing pavement and/or storage areas in the McNear's Brickyard storage area. As this component of ARP04 does not comply with the setback requirements for the Baylands Corridor contained in the Countywide Plan Update, Mitigation Measure R4.3-5b is necessary to further mitigate this impact.	R4.3-5a: The Marin County DPW shall be responsible for ensuring that setbacks are established and maintained, and that BMPs and other measures to avoid construction-related impacts on wetlands are implemented during reclamation activities.	Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval, and ongoing throughout period of reclamation.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan, and ongoing during quarry reclamation.
R4.3-5b: All jurisdictional wetland areas to be avoided shall be protected by setbacks throughout site reclamation and post-reclamation development consistent with the Baylands Corridor designation of the site in the Countywide Plan Update: <ul style="list-style-type: none">• Setbacks for the NW Quadrant marshes shall be consistent with the requirements of the Baylands Corridor designation for the site. During reclamation activities, no temporary or permanent reclamation stockpiles, berms, or other features shall be placed within 100 feet of the NW Quadrant marshes. Buffers shall be included as part of post-reclamation development design in the vicinity of the NW Quadrant marshes and shall be a minimum of 100 feet in width.• Setbacks for seeps and seasonal wetlands shall be a minimum of 50 feet.• Areas that are avoided and provided with setbacks will be further protected by Best Management Practices (BMPs).		R4.3-5b: Conditions of additional permits needed for work within jurisdictional waters will be monitored by the relevant permitting agencies, including the USACE, RWQCB, and BCDC.	Upon submittal of permit applications for work within jurisdictional wetlands	Appropriate permitting agency (USACE, RWQCB, CDFG, BCDC), at time of permit application review.

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-5 (cont.)</p>	<p>as described in Mitigation Measure R4.3-5d below. Such measures include the installation of silt fencing, straw wattles or other appropriate erosion and sediment control methods or devices along roads and at the 100 foot setback limits. Such BMPs shall also be employed if and when reclamation grading and post-reclamation development requires work within the setbacks as described above, between the feature and the activity.</p> <p>R4.3-5c: All necessary jurisdictional wetland permits and approvals of appropriate regulatory agencies shall be obtained prior to each relevant phase of reclamation.</p> <p>R4.3-5d: The applicant shall conduct reclamation activities in a manner that avoids erosion and sedimentation of wetland areas, through implementation of standard BMPs to maintain water quality and control erosion and sedimentation during construction as required by compliance with the General National Pollution Discharge Elimination System (NPDES) Permit for Construction Activities and as established by mitigation measures set forth in Section 4.5, Hydrology and Water Quality.</p> <p>Mitigation measures would include, but would not be limited to, installing silt fencing between jurisdictional waters and project related activities, locating fueling stations away from potentially jurisdictional features, and otherwise isolating construction work areas from any identified jurisdictional features. In addition, BMPs identified in the Long-term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) (Corps, 2001) shall be implemented to prevent degradation of water quality resulting from dredging activities within open waters. These BMPs include: silt fencing and gunnerbooms or other appropriate methods for keeping dredged materials from leaving the project site.</p> <p>R4.3-5e: The applicant shall revise the ARP to include as a standard for guiding development of the final Development Plan that post-reclamation residential, commercial, and mixed use development, except as otherwise permitted by BCDC, shall not occur within the 100 foot shoreline band subject to BCDC jurisdiction.</p>			

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-6: Reclamation activities and post-reclamation development activities such as dredging, pile driving, jetty construction, and other "in-water" construction activities would result in temporary disturbances to aquatic biological resources and Essential Fish Habitat.</p>	<p>R4.3-6a: Prior to open-water construction activities, the applicant shall obtain the necessary permits from the USACE and other regulatory agencies. Open-water construction will not begin prior to obtaining necessary permits.</p> <p>R4.3-6b: All open-water construction activities shall adhere to the guidelines of the then-current version of the LTMS.</p> <p>R4.3-6c: To minimize wetland disturbance the construction of the connecting channel from the Main Quarry Bowl to the Bay and removal or installation of rip-rap along the Bay shoreline will either operate from dry land or from water-based equipment such as barges, scows, derrick barges, and tugs.</p>	<p>R4.3-6: USACE and other permit conditions are likely to include the relevant guidelines of the LTMS; it is anticipated that adherence to these conditions will be monitored by the USACE or other agencies, such as NMFS, designated in the permits.</p>	<p>Upon submittal of application for permit for open-water construction activities.</p>	<p>Appropriate permitting agency (such as USACE), during review of permit application and subsequently during work performed under any such permit.</p>
<p>R4.3-7: Poor water quality in the deep water within the flooded Main Quarry Bowl could occur due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin. This condition could result in impacts to special-status aquatic species.</p>	<p>R4.3-7: Implement Mitigation Measure R4.5-6 in Section 4.5, Hydrology and Water Quality.</p>	<p>R4.3-7: The Marin County Department of Public Works will be responsible for reviewing the report specified in Mitigation Measure R4.5-6.</p>	<p>See referenced mitigation measure (R4.5-6).</p>	<p>See referenced mitigation measure (R4.5-6).</p>
<p>R4.3-8: Reclamation activities conducted in the vicinity of the process water ponds in the NW and SW Quadrants have the potential to adversely impact California red-legged frog.</p>	<p>R4.3-8a: ARPO4 includes surveys for CRLF in its "Standards for Preserving Sensitive Habitat Areas," to be conducted prior to filing for grading permits for each reclamation phase, as well as undefined setbacks to be established in the site's Development Plan.</p>	<p>R4.3-8a: Surveys for CRLF in its "Standards for Preserving Sensitive Habitat Areas," shall be conducted prior to filing for grading permits for each reclamation phase. Results shall be submitted to USFWS and CDFG.</p>	<p>Upon submittal of application for grading permits for each reclamation phase.</p>	<p>Verified by Marin County DPW during review of grading permit applications, and during site inspections.</p>
<p>R4.3-8b: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW and SW Quadrants in a manner that avoids take of CRLF through surveys to determine whether the species is present, and, if so, to reduce the risk of take of individuals of the species, as specified below. Specifically, the following measures shall be implemented:</p> <ul style="list-style-type: none"> The project proponent shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines prior to filing for grading permits for Reclamation Phase 1. The habitat 	<p>R4.3-8b: The Marin County DPW shall verify that a CRLF habitat assessment and protocol-level surveys, if required, have been completed and reviewed by USFWS prior to issuance of the grading permits. DPW will notify USFWS if take of CRLF occurs in association with the project within 48 hours of the incident.</p>	<p>R4.3-8b: The Marin County DPW shall verify that a CRLF habitat assessment and protocol-level surveys, if required, have been completed and reviewed by USFWS prior to issuance of the grading permits. DPW will notify USFWS if take of CRLF occurs in association with the project within 48 hours of the incident.</p>	<p>Prior to issuance of grading permit for each reclamation phase.</p>	<p>Verified by Marin County DPW prior to issuance of grading permit for each reclamation phase.</p>

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-8 (cont.)</p>	<p>assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process water ponds in the NW and SW Quadrants) on the project site</p> <ul style="list-style-type: none"> If no CRLF are found during the habitat assessment and/or protocol level surveys associated with Phase 1 reclamation activities then the project proponent shall consult with USFWS as to the necessity of conducting further assessments or surveys for Phases 2 through 4 and/or for post-reclamation development. If, as a result of the habitat assessment and/or protocol level surveys, CRLF are found on the project site, the project applicant shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the federal Endangered Species Act). Specific measures to protect CRLF shall be determined in consultation with USFWS and may include, but are not limited to, the following measures, which are derived from the USFWS Programmatic Biological Opinion (PBO) for impacts to CRLF. The PBO summarizes typical project effects and provides generic preventative measures designed to substantially reduce the risk of incidental "take" of CRLF within the project area: <ul style="list-style-type: none"> The name and credentials of a biologist qualified to act as construction monitor shall be submitted to USFWS for approval at least 15 days prior to commencement of work. A qualified biologist shall conduct pre-construction surveys within aquatic habitat by two weeks prior to the onset of construction activities. Surveys shall be completed for all life cycle stages of CRLF (e.g., egg masses, tadpole, juveniles, and adults) that may occur within the project area. If adult CRLF, tadpoles or eggs are found within the construction disturbance zone, the 			

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.) R4.3-8 (cont.)	<p>approved biologist shall contact USFWS to determine if moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved biologist shall be allowed sufficient time to move them from the construction sites before work activities begin. If no frogs are detected during these surveys, construction-related activities may proceed without further requirements for the protection of individuals, although habitat protection measures (i.e., avoidance of intermittent drainages and riparian habitat) shall still be observed.</p> <ul style="list-style-type: none"> - Exclusionary fencing, such as silt fences, shall be installed around the process ponds and around all construction areas that are within 100 feet of or adjacent to potential CRLF habitat. Once fencing is in place, it shall be maintained by the proponent until completion of construction within or adjacent to the enclosure. - Prior to commencement of any earthmoving activities, the monitoring biologist shall train all construction personnel and work crews on the sensitivity and identification of the CRLF and the penalties for the "take" of this species. In addition, visual materials shall be provided to assist in identifying the species. Training sessions will be repeated for all new employees before they access the project site and periodically throughout project construction. - The monitoring biologist will demarcate construction avoidance areas in the field and monitor construction activities within 300 feet of aquatic habitat for CRLF. The demarcation shall remain on-site until all initial vegetation clearing and habitat disturbance is completed. - All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from any riparian habitat or water. 			

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MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-9: Reclamation activities and post-reclamation development activities conducted in the vicinity of the process water ponds in the NW Quadrant have the potential to impact northwestern pond turtles.</p>	<p>R4.3-9: The applicant shall conduct reclamation and post-reclamation development activities in and around the process water ponds in the NW Quadrant in a manner that avoids take of northwestern pond turtle through surveys to determine whether the species is present, and, if so, to limit reclamation and post-reclamation development activities as specified below. Specifically, prior to filing for Phase 1 reclamation grading permits, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform northwestern pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant. Surveys and subsequent actions shall include the following:</p> <ul style="list-style-type: none"> • Surveys shall be conducted for nests as well as individuals. • If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas. • No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests. • If a nest is located within the process pond area and may be impacted by reclamation activities, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG. • If no turtles are found during surveys associated with Phase 1 reclamation activities the project proponent shall consult with CDFG regarding the need for further future surveys. 	<p>R4.3-9: The Marin County DPW shall verify the submittal of a northwestern pond turtle survey report, as well as the implementation of protective measures, if necessary, prior to issuance of Phase 1 grading permits. A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submit to the County and to CDFG.</p>	<p>Prior to issuance of Phase 1 grading permit.</p>	<p>Verified by Marin County DPW, prior to issuance of Phase 1 grading permit.</p>

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MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-10: Reclamation activities resulting in the destruction of abandoned buildings or tree removal within the San Rafael Rock Quarry could adversely impact special status bat species.</p>	<p>R4.3-10: The applicant shall conduct reclamation activities involving tree removal and building demolition in a manner that avoids disturbance or mortality of bats, through surveys to determine whether bats are present, and, if so, to limit reclamation activities as specified below. Specifically, the applicant shall take the following measures to avoid direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula:</p> <ul style="list-style-type: none"> • A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of all potential bat habitat within 500 feet of reclamation activities prior to initiation of such activities. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night). • Removal of trees or demolition of buildings showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal or building demolition. • A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Bat roosts initiated during construction are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals, including harming, harassing, or killing, will be prohibited. • If pre-construction surveys indicate that roosts are inactive or potential habitat is unoccupied during the reclamation or construction period, no further mitigation is 	<p>R4.3-10: The Marin County DPW shall verify that bat survey reports have been submitted prior to tree removal and shall not issue a grading permit, if required, prior to submittal of the bat survey report.</p>	<p>Upon submittal of application for grading permits for each reclamation phase, and prior to removal of trees or structures.</p>	<p>Verified by Marin County DPW prior to issuance of grading permit for each reclamation phase, and prior to tree or structure removal.</p>

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MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.)				
R4.3-10 (cont.)	<p>required. Trees and buildings that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished.</p> <ul style="list-style-type: none"> If known bat roosting habitat is to be destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed at least two weeks prior to such disturbance in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist. 			
R4.3-11: Reclamation activities and post-reclamation development could adversely affect special-status nesting raptors and other nesting birds.	<p>R4.3-11a: ARP04 includes nesting raptor surveys as part of the "Standards for Preserving Sensitive Habitat Areas."</p> <p>R4.3-11b: The applicant shall conduct reclamation and post-reclamation development activities in a manner that avoids direct losses of nests, eggs, and nestlings and indirect impacts to avian breeding success. Specifically:</p> <ul style="list-style-type: none"> During the breeding bird season (January 1 through August 31) a qualified biologist will survey activity sites for nesting raptors and passerine birds not more than 14 days prior to any ground-disturbing activity or vegetation removal. If reclamation or construction activities occur only during the non-breeding season between September 1 and December 31, no surveys will be required. Results of the surveys will be forwarded to CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis. Avoidance procedures shall be reviewed and approved by CDFG. Depending on the species involved, these may include construction buffer areas (up to several hundred feet in the case of raptors) or seasonal restriction of activities. 	<p>R4.3-11: Each year, prior to the commencement of bird breeding season (January 1), SRRQ shall submit a memorandum to the Marin County DPW stating whether the quarry intends to conduct any reclamation activities during the following year that could impact breeding birds. If so, the quarry will be required to undertake the survey specified in Mitigation Measure R4.3-11b. The Marin County DPW shall verify the submittal of breeding bird surveys.</p> <p>Results of the surveys will be forwarded to CDFG and avoidance procedures will be adopted, if necessary, on a case-by-case basis. Avoidance procedures shall be reviewed and approved by CDFG. Depending on the species involved, these may include construction buffer areas (up to several hundred feet in the case of raptors) or seasonal restriction of activities.</p>	<p>Prior to January 1 of each year.</p>	<p>Verified by Marin County DPW and CDFG.</p>

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Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>R4.3-12: Post-reclamation residential and commercial development adjacent to marsh habitat could result in long-term adverse impacts to special-status species inhabiting the adjacent marsh habitat through increases in the levels of human noise and activity, lighting, as well as the introduction of domestic animals.</p>	<p>R4.3-12a: ARP04 proposes to establish buffer areas around the marshes.</p> <p>R4.3-12b: The applicant shall submit revisions to ARP04 that include a standard for development of the final Development Plan (to be submitted three years prior to cessation of mining activities) that requires the applicant to conduct post-reclamation development activities in a manner that avoids harassment, disturbance, and mortality of nesting birds and other wildlife that inhabit the SRRQ marshes. The standard will include development of a Marsh Wildlife and Habitat Protection Plan, to be prepared as a part of the Development Plan, and subject to review and approval by the Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. Components of the plan will include, but not be limited to, the following:</p> <ul style="list-style-type: none"> In accordance with the policies set forth in the Marin Countywide Plan (2007) the project development footprint will maintain a set back of at least 100 feet from marsh habitat on the project site. Cyclone fencing with vinyl slats for screening shall be installed at the setback distance between the marshes and all residential or commercial development. Appropriate native vegetation will be planted both inside and outside of the fence to provide further screening. The fence will be designed specifically to provide a barrier to exclude cats, dogs, and other household pets from marsh areas and will also provide a visual screen between marsh wildlife and human activity. To minimize the potentially-adverse effect of night lighting on the adjacent salt marsh habitat the following will be utilized: street lighting only at intersections, low-intensity street lamps and low elevation lighting poles, and internal silvering of the globe or external opaque reflectors to direct light away from marsh habitat. In addition, private sources of illumination around homes shall also be directed and/or shaded to minimize glare into the marsh. 	<p>R4.3-12a: The Marin County DPW will be responsible for reviewing the revised ARP for completeness prior to project approval.</p> <p>R4.3-12b: The Marin County Community Development Agency, the California Department of Fish and Game, and the U.S. Fish and Wildlife Service shall be jointly responsible for review and approval of the Marsh Wildlife and Habitat Protection Plan as part of review and approval of the final Development Plan.</p>	<p>Upon submittal of Conforming Amended Reclamation Plan, within 60 days of permit approval.</p> <p>During review of final Development Plan</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan.,</p> <p>Marin County CDA and appropriate resource agencies, prior to approval of final Development Plan.</p>

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MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.)				
R4.3-12 (cont.)	<ul style="list-style-type: none"> An education program for residents will be developed including posted interpretive signs and informational materials regarding the sensitivity of the marsh habitat, the dangers of unleashed domestic animals in this area, and discouragement of the practice of feeding feral cats. 			
<p>P4.3-13: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect California red-legged frogs should they occur at the Quarry site.</p>	<ul style="list-style-type: none"> The applicant shall conduct Quarry operations in a manner that avoids take of California red-legged frog. This mitigation measure shall be implemented through the following: <ul style="list-style-type: none"> As a condition of approval of the AQP by the County, and prior to any site disturbing activity within 300 feet of the ponds or fresh water marsh, the applicant shall retain a qualified biologist to conduct a habitat assessment for CRLF according to U.S. Fish and Wildlife Service (USFWS) guidelines. The habitat assessment shall be submitted to USFWS for review. If, following the review of the habitat assessment, USFWS recommends protocol-level field surveys, then the project sponsor shall conduct protocol-level field surveys for CRLF within aquatic habitat that provides potential breeding habitat (the process ponds in the NW and SW Quadrants) on the project site. The project proponent shall provide the County with the results of the habitat assessment, USFWS review, and protocol-level surveys, if required, prior to any site disturbing activity within 300 feet of the subject areas. If no CRLF are found during the habitat assessment or protocol level surveys, then with the concurrence of USFWS, no further mitigation shall be required. If, as a result of the habitat assessment or protocol level surveys, CRLF are found to inhabit the process ponds in the NW and SW Quadrants, the project proponent shall initiate informal consultation with the USFWS to determine the need for formal consultation and preparation of a Biological Assessment and Biological Opinion (required by the Federal Endangered Species Act). Consultation will consider whether or not continued use of the process ponds in the NW and/or SW Quadrants is possible without take of CRLF and whether or not a take permit would be required for continued use. 	<p>P4.3-13: The Marin County DPW shall verify that a CRLF habitat assessment and protocol-level surveys, if required, have been completed and reviewed by USFWS prior to site disturbing activity within 300 feet of the three process water ponds or the freshwater marsh. Each year, as part of its annual report to the County, SRRQ shall provide a statement regarding its intent, if any, to conduct site-disturbing activity within 300 feet of the ponds or fresh water marsh, and of its plans for conducting the specified habitat assessment.</p> <p>The habitat assessment and survey results shall be submitted to USFWS for review.</p> <p>The project proponent shall provide the County with the results of the habitat assessment, USFWS review, and protocol-level surveys, if required, prior to any site disturbing activity within 300 feet of the subject areas.</p>	<p>Annually, and prior to site-disturbing activity within 300 feet of the ponds or fresh water marsh.</p>	<p>Verified by Marin County DPW, annually, and prior to site-disturbing activity as specified.</p>

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MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Biological Resources (cont.)</p> <p>P4.3-14: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect northwestern pond turtle should they occur at the Quarry site.</p>	<p>P4.3-14: The applicant shall conduct Quarry operations in a manner that avoids disturbance to or mortality of northwestern pond turtle. This mitigation measure shall be implemented through the following: As a condition of approval for the AQP by the County and prior to any site disturbing activity within 300 feet of the NW Quadrant process water ponds, a qualified biologist who is permitted by CDFG to move turtles and their nests shall perform western pond turtle surveys within suitable habitat in and around the process ponds in the NW Quadrant.</p> <ul style="list-style-type: none"> • Surveys shall be conducted for nests as well as individuals. • If WPT are found during initial surveys a qualified biologist shall be present when project-related activities within or adjacent to suitable aquatic habitat for northwestern pond turtle are occurring and will be responsible for temporarily relocating adult WPT that move into work areas. • No work within the process ponds or on their banks will proceed until the work area is determined to be free of WPT or their nests. • If a nest is located within the process pond area and may be impacted by Quarry associated operations, it shall be caged to exclude predators and monitored closely until the eggs hatch. Hatchlings shall be moved to an appropriate facility and reared until they are large enough to survive in the wild. They shall then be released into appropriate suitable habitat. All aspects of these activities shall be conducted by a qualified biologist in consultation with CDFG. • A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG. 	<p>P4.3-14: The Marin County DPW shall verify the submittal of a WPT survey report, as well as the implementation of protective measures, if necessary, have been completed and reviewed by USFWS prior to site disturbing activity within 300 feet of the two process water ponds. Each year, as part of its annual report to the County, SRRQ shall provide a statement regarding its intent, if any, to conduct site-disturbing activity within 300 feet of the ponds or fresh water marsh, and of its plans for conducting the specified habitat assessment. A report shall be prepared by a qualified biologist documenting the presence/absence of WPT at SRRQ, as well as the measures taken to protect them if present, and submitted to the County and to CDFG.</p>	<p>Annually, and prior to site-disturbing activity within 300 feet of the ponds or fresh water marsh.</p>	<p>Verified by Marin County DPW, annually, and prior to site-disturbing activity as specified.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>P4.3-15: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status birds at the Quarry site as well as heron and egret rookeries at the Marin Islands Wildlife Refuge.</p>	<p>P4.3-15: The applicant shall conduct Quarry operations in a manner that avoids direct losses of nests, eggs, and nestlings and potential indirect impacts to avian breeding success resulting from vegetation removal as well as variability in quarrying activity levels on South Hill. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> • During the breeding bird season (January 1 through August 31) a qualified biologist will survey sites for nesting raptors and passerine birds not more than 14 days prior to any vegetation removal (including trees, shrubs, scrub, and grassland vegetation). In addition, vegetation on South Hill will be surveyed if quarrying activities on South Hill cease for a period of more than one week during breeding bird season. • Surveys shall also be conducted during breeding season in those areas of the project site that a qualified biologist determines may have nesting special status bird species present that could potentially be impacted by indirect noise impacts of operations such as truck traffic or blasting at that time. • If vegetation removal or cessation of mining activities on South Hill occurs only during the non-breeding season, between September 1 and December 31, no surveys will be required. • Results of the surveys will be forwarded to the County and CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis that will ensure that the potential for an impact on any nesting raptors or passerine birds is eliminated. Depending on the species, these can include buffer areas (up to several hundred feet in the case of raptors) or seasonal avoidance. Vegetation of any kind identified as supporting active nests will not be removed until nestlings have fledged. If survey results are positive for nesting birds, vegetation removal or mining on South Hill will not occur until submittal and review of reports and implementation of any necessary avoidance measures. Special-status bird sightings shall also be submitted to the CNDDDB. 	<p>P4.3-15: The Marin County DPW shall verify the submittal of breeding bird surveys as part of routine quarry inspection or as a condition of any DPW permit, such as grading. Each year, prior to the commencement of bird breeding season (January 1), SRRQ shall submit a memorandum to the Marin County DPW stating whether the quarry intends to conduct any reclamation activities during the following year that could impact breeding birds. If so, the quarry will be required to undertake the survey specified in Mitigation Measure P4.3-15. The Marin County DPW shall verify the submittal of breeding bird surveys. Results of the surveys will be forwarded to the County and CDFG (as appropriate) and avoidance procedures will be adopted, if necessary, on a case-by-case basis that will ensure that the potential for an impact on any nesting raptors or passerine birds is eliminated. Depending on the species, these can include buffer areas (up to several hundred feet in the case of raptors) or seasonal avoidance. Vegetation of any kind identified as supporting active nests will not be removed until nestlings have fledged. If survey results are positive for nesting birds, vegetation removal or mining on South Hill will not occur until submittal and review of reports and implementation of any necessary avoidance measures. Special-status bird sightings shall also be submitted to the CNDDDB.</p>	<p>Prior to January 1 of each year.</p>	<p>Verified by Marin County DPW and CDFG.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>P4.3-16: Continued operations at the Quarry under an Amended Surface Mining and Quarrying Permit could adversely affect special-status bats at the Quarry site.</p>	<p>P4.3-16: The applicant shall conduct Quarry operations in a manner that avoids direct mortality of roosting special-status bats and disturbance of maternity roosts or winter hibernacula. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> A qualified bat biologist, acceptable to the CDFG, shall conduct surveys of trees slated for removal as a result of quarrying activity. Potentially suitable habitat shall be located visually. Bat emergence counts shall be made at dusk as the bats depart from any suitable habitat. In addition, an acoustic detector shall be used to determine any areas of bat activity. At least four nighttime emergence counts shall be undertaken on nights that are warm enough for bats to be active. The bat biologist shall determine the type of each active roost (i.e., maternity, winter hibernaculum, day or night). Removal of trees showing evidence of bat activity will occur during the period least likely to impact the bats as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula and between August 15 and April 15 for maternity roosts). If active day or night roosts are found the bat biologist shall take actions to make such roosts unsuitable habitat prior to tree removal. A no-disturbance buffer shall be created around active bat roosts being used for maternity or hibernation purposes at a distance to be determined in consultation with CDFG. Active bat roosts located within 500 feet and line of sight of existing centers of Quarry activities are presumed to be unaffected, and no buffer is necessary. However, "take" of individuals will be prohibited. If surveys indicate that roosts are inactive or potential habitat is unoccupied, no further mitigation is required. Trees that have been determined to be unoccupied by special status bats and that are located outside the no-disturbance buffer for active roosts may be removed or demolished. 	<p>P4.3-16: The Marin County DPW shall verify that bat survey reports have been submitted as part of routine quarry inspection or as a condition of any DPW permit, such as grading. Prior to quarry-related tree removal a report shall be submitted to the County that details the survey results and any actions taken to protect special-status bats. Any special-status bat sightings shall also be submitted to the CNDDDB.</p>	<p>Prior to removal of trees or structures.</p>	<p>Verified by Marin County DPW prior to tree or structure removal.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.)				
P4.3-16 (cont.)	<ul style="list-style-type: none"> If known bat roosting habitat is to be destroyed during tree removal or building demolition activities, artificial bat roosts shall be constructed at least two weeks prior to such disturbance in an undisturbed area of the property, at least 200 feet from any ongoing or future activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist. Prior to quarry-related tree removal a report shall be submitted to the County that details the survey results and any actions taken to protect special-status bats. Any special-status bat sightings shall also be submitted to the CNDDB. 			
C4.3-18: Impacts of the ARP and AQP on the salt marshes present at the project site would make a considerable contribution to cumulative impacts on marsh habitat.	<p>C4.3-18a: See Mitigation Measure R4.3-5a.</p> <p>C4.3-18b: The applicant shall prepare a Marsh Restoration plan and implement the recommendations as soon as practicable, and in any case, shall complete the marsh restoration prior to completion of Phase 1 reclamation. This mitigation measure will be implemented through the following:</p> <ul style="list-style-type: none"> The project proponent shall develop and submit a Tidal Marsh Restoration plan to the County and other applicable resource agencies within 1 year of approval of the AQP. The Plan will include, but not be limited to, the following elements: <ul style="list-style-type: none"> A baseline study of existing marsh conditions, including topography, a complete analysis of current hydrology, vegetation, and wildlife that will be used to inform subsequent marsh restoration planning. A thorough analysis of the potential effects of tidal restoration on adjacent infrastructure and existing marsh vegetation. Development of a suite of restoration alternatives, with tidal restoration as the preferred alternative, providing constraints do not preclude this course of action. Feasible goals for marsh restoration with quantifiable objectives that can be measured over time to determine whether goals are being met. 	C4.3-18: The Marin County DPW shall verify that that a Tidal Marsh Restoration Plan has been prepared within one year of approval of the AQP and shall monitor its implementation through periodic inspections and receipt of progress reports from the Quarry. The Marin County DPW, as well as any other permitting agencies (should permitting be required as part of restoration), shall review annual monitoring reports.	Plan to be prepared within one year of AQP approval; implementation schedule will be specified in the plan, but shall be completed prior to completion of phase 1 reclamation.	Verified by Marin County DPW with input from appropriate resource agencies, upon submittal of plan. Plan implementation monitoring verified on a periodic basis or at conclusion of specific restoration actions.

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Biological Resources (cont.)				
C4.3-18 (cont.)	<ul style="list-style-type: none"> - A detailed plan for marsh restoration, including, if necessary to achieve objectives, plans for excavation of new channels, addition of new culverts, setbacks, buffers, etc. - A maintenance schedule for any mechanical devices or features, such as tide gates, specified in the plan. - A monitoring plan to determine optimum inundation levels for the marshes. This would include measurements of hydrology, sediment accretion, and changes in vegetation over time. - A schedule for annual monitoring reports, which shall be submitted to the Department of Public Works, as well as all permitting agencies as required. 			
Geology, Soils, and Seismicity				
R4.4-1: Prior to the completion of site reclamation, the project site could be subject to slope instability hazards, including landslides, debris flows, and rockfalls caused by seismic or non-seismic mechanisms.	R4.4-1: The applicant shall include the recommendations made in the Supplemental Geotechnical Data Report Proposed Changes to Mining Plan by ENGEO, incorporated dated April 11, 2005 as part of the proposed project. These recommendations include conducting supplemental geotechnical pit observations, groundwater monitoring, and slope monitoring which shall be conducted by a California Certified Engineering Geologist or Registered Professional Geotechnical Engineer with oversight by the State Office of Mine Reclamation. In addition, the average slope inclination shall not exceed 60 degrees for a maximum vertical height of 350 feet, a minimum of 30-foot-wide benches shall be constructed at maximum 90-foot intervals, and inter-bench face inclinations shall not exceed 75 degrees.	R4.4-1: It is anticipated that the requirements of Mitigation measure R4.4-1 will become conditions of approval of the ARP, and as such, will be monitored by the Marin County DPW.	Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these standards.
R4.4-2: Soil erosion of exposed cut or fill slopes, native slopes with removed vegetation, and soil stockpiles could result in soil erosion and loss of topsoil.	R4.4-2a: The applicant has prepared a Stormwater Management Plan and Stormwater Pollution Prevention Plan that specifies best management practices for reducing erosion and sedimentation. The applicant has also prepared Standards for Stormwater and Erosion Control of Reclaimed Areas and Standards for Revegetation of Reclaimed Areas, both of which will apply to reclamation activities (see Chapter 3, Project Description).	R4.4-2: It is anticipated that the requirements of Mitigation measure R4.4-2b will become conditions of approval of the ARP, and as such, will be monitored by the Marin County DPW.	Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Geology, Soils, and Seismicity (cont.)	<p>R4.4-2b: Mitigation Measure R4.4-2b. The project applicant shall incorporate into the grading and construction specifications provisions requiring that all phases of construction implement best management practices (BMPs) to reduce and eliminate soil erosion and loss of topsoil. The contractor shall implement these BMPs, and the contractor shall be responsible for the inspection and maintenance of the BMPs through all phases of reclamation.</p> <p>Mitigation Measure R4.5-2b in Section 4.5, Hydrology and Water Quality, also contains measures that would serve to further mitigate potential erosion effects.</p>			operations and reclamation shall contain a review of their conformance with these measures.
R4.4-3: Unstable slopes or soils could adversely affect post-reclamation land uses of the Quarry site.	<p>R4.4-3a: The proposed grading and other earthwork activities included in ARP04 would be designed such that all potential development areas would be located on either bedrock or consolidated engineered fill, with known and predictable strengths and stability.</p> <p>R4.4-3b: The geotechnical recommendations provided in the Supplemental Geotechnical Data Report, which are being implemented as part of the project (see Mitigation Measure R4.4-1) include the preparation of a design-level geotechnical investigation following the cessation of mining.</p> <p>R4.4-3c: The additional studies recommended in the Supplemental Geotechnical Data Report and specified in Mitigation Measure R4.4-3b will include a study to determine how the site may be developed following reclamation in order to avoid or mitigate to less than significant impacts related to soil and slope stability.</p> <p>At the time the study is prepared, there will be a greater understanding of the bedrock stability and the properties and performance of the Quarry walls. A comprehensive re-evaluation of slope stability shall be performed based on results from geotechnical observations throughout the mining period, groundwater monitoring, slope monitoring, and laboratory testing of on-site materials which would include compression tests and shear tests of joint surfaces.</p>	R4.4-3: It is anticipated that the specifics of the final Development Plan, including site-specific geotechnical investigation and application of its results, will become conditions of approval of the ARP, and as such, will be monitored by the Marin County DPW.	Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval, and upon submittal of final Development Plan.	Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and during review of final Development Plan.

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Geology, Soils, and Seismicity (cont.)</p> <p>R4.4-3 (cont.)</p>	<p>The design-level, site-specific geotechnical investigation shall be prepared by a California licensed Geotechnical Engineer or Certified Engineering Geologist and include review of the supplemental geotechnical evaluations and monitoring conducted throughout the history of mining activities. The investigation shall include final grading recommendations, mitigation of any identified compressible or liquefiable soils, slope stability analyses, calculation of factors of safety, and structural foundation recommendations to ensure that post-reclamation development will be in accordance with the then-current requirements of the California Building Code and the Marin County Building and Safety Division or City of San Rafael Building Code. These recommendations shall be incorporated into the final design plans for post-reclamation development.</p> <p>R4.4-3d: If the design-level, site-specific geotechnical investigation specified above determines that achievement of factors of safety adequate for the intended post-reclamation uses are infeasible in some or all of the reclaimed Quarry, the report shall specify appropriate alternative post-reclamation uses or limitations on the planned use.</p>			
<p>Hydrology and Water Quality</p> <p>R4.5-2: Grading associated with the proposed project would increase the potential for eroded sediments to degrade the quality of surface water sources including the San Francisco Bay.</p>	<p>R4.5-2a: ARP04 includes a Stormwater Management Plan and Stormwater Pollution Prevention Plan, both of which will be implemented as part of the project.</p> <p>R4.5-2b: The applicant shall include as part of the SWPPP and Stormwater Management Plan, a monitoring and maintenance element that would require scheduled periodic monitoring of BMP performance and condition. At a minimum, stormwater and erosion control BMPs shall be monitored after major storms, prior to the first rain event, and midway through large storm events extending over several days. Temporary BMPs (e.g., fiber rolls) shall be monitored for performance and immediately replaced if necessary. Performance and failure of BMPs shall be described in the annual report to the RWQCB as required under the SWPPP. Monitoring and maintenance shall be conducted by an erosion control specialist contracted by the applicant. Monitoring and maintenance reports shall be filed with the applicant and available to the County on request.</p>	<p>R4.5-2: The Marin County DPW will be responsible for monitoring implementation of the above mitigation measure, which will become a condition of approval of the project. Monitoring will occur during periodic inspections of the Quarry.</p>	<p>Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval, and ongoing during quarry operations and reclamation.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these plans.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Hydrology and Water Quality (cont.)				
<p>R4.5-6: Poor water quality conditions could occur in the deep water within the flooded Main Quarry Bowl due to long residence times and stratification at depth. The proposed project may result in degradation of water quality within the deep areas of the harbor basin.</p>	<p>R4.5-6: Within one year of approval of the Amended Reclamation Plan, the applicant shall submit a concept engineering and economic report for use and future maintenance of a mechanical mixing or aeration system, or another engineered approach, that will result in avoidance or elimination of a stratified water column within the Main Quarry Bowl after it is flooded. The report will be conducted by qualified limnologists and water quality engineers. The system design will be at a schematic level and will be stamped by a California professional engineer, and will include calculations that demonstrate that the system will maintain water quality objectives established in the San Francisco Bay Regional Water Quality Control Board's Basin Plan. The report will include an analysis of operating and maintenance costs for the system, as well as predicted energy requirements and greenhouse gas emissions, and a plan for minimizing both of these; and will identify a funding source to ensure continued operation of the system after reclamation.</p>	<p>R4.5-6: The Marin County DPW will be responsible for reviewing the report and schematic design specified in Mitigation Measure R4.5-6.</p>	<p>Within one year of approval of the ARP.</p>	<p>Verified by Marin County DPW, within one year of approval of the ARP.</p>
<p>R4.5-8: The project reclamation and post-reclamation activities would result in an increase in the possibility of inundation by a mudflow, seiche, tsunami, or sea level rise.</p>	<p>R4.5-8: Prior to implementation of Phase 4 reclamation, the Quarry shall model effects of the maximum expected tsunami, seiche event, and anticipated sea level rise, considering the latest climate change information, and county policies and regulations in effect at the time, and proposed adequate setback and final contour elevations in a report to the County. A revise Phase 4 reclamation plan shall be submitted as appropriate.</p>	<p>R4.5-8: The Marin County DPW will be responsible for reviewing the modeling report and, if required, reviewing and approving the revised Phase 4 reclamation plan to backfill the Main Quarry Bowl.</p>	<p>Upon submittal of application for grading permit for Phase 4 reclamation.</p>	<p>Verified by Marin County DPW, during review of grading permit for Phase 4 reclamation, and during and at conclusion of Phase 4 reclamation grading.</p>
<p>R4.5-10: Post-reclamation development could produce stormwater runoff that would result in a degradation of surface water quality.</p>	<p>R4.5-10: The applicant shall submit a revised ARP that includes standards for preventing polluted stormwater runoff from entering the Main Quarry Bowl after it is flooded. The standards will be used to guide development of the final Development Plan, due to be submitted three years prior to the anticipated completion of mining.</p>	<p>R4.5-10: The Marin County DPW will be responsible for reviewing the revised ARP for completeness prior to project approval.</p>	<p>Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval, and upon submittal of final Development Plan.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and during review of final Development Plan.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Land Use and Planning</p> <p>R4.6-3: ARP04 would conflict with existing uses at the periphery of the project site as a result of incompatible land uses.</p>	<p>R4.6-3a: As stated in Section 4.7, as a project mitigation, SRRQ proposes to construct a berm along the northern border of the NE Quadrant, and to retrofit all rolling vehicles at the Quarry with broadband backup alarms. Broadband alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), by being 5 dBA quieter than conventional back-up alarms, and by generating noise that has a less intrusive tonal quality.</p> <p>R4.6-3b: Implement Mitigation Measure R4.7-1b.</p> <p>R4.6-3c: In addition to the requirements of Mitigation Measure R4.7-2, implementation of the following construction noise abatement measures would reduce the annoyance impact of construction and reclamation activity noise.</p> <ul style="list-style-type: none"> • The applicant shall limit all reclamation grading activities in the NE Quadrant to 7:00 a.m. to 5:00 p.m. Monday through Friday. • Equipment and trucks used for all reclamation activities shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds). • All construction equipment powered by internal combustion engines shall be properly muffled and maintained; • Unnecessary idling of internal combustion engines shall be prohibited. <p>R4.6-3d: Each year by May 1 and not later than 30 days prior to the commencement of reclamation activities, SRRQ shall inform by mail all residences on Marin Bay Park Court, Heritage Drive, and San Marino Drive, and the public at large of the start date, nature of the work, and expected duration of the 8-10 week period during which reclamation grading activities will occur that year.</p>	<p>R4.6-3: The Marin County DPW will monitor implementation of and adherence to Mitigation Measures R4.6-3a, b, c, and d. The standards and measures specified in the mitigation measures will be incorporated into a revised Amended Reclamation Plan</p>	<p>Upon submittal of Conforming Amended Reclamation Plan within 60 days of permit approval, and ongoing during quarry operations and reclamation.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these standards.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Land Use and Planning (cont.)</p> <p>R4.6-5: Activities associated with the phased implementation of the reclamation plan would conflict with County Code Title 22 (Section 22.112.020) restrictions on nonconforming uses.</p>	<p>R4.6-5a: ARP04 proposes to limit reclamation grading activities to an 8-10 week period during each dry season.</p> <p>R4.6-5b: Although the effects of the intensification of site activities resulting from the reclamation plan cannot be precisely quantified, implementation of Mitigation Measure R4.6-3b, above, regarding noise, and measures to control dust currently being implemented, required by existing permits, proposed by the applicant or identified in this EIR as discussed at Impact 4.2-1 and Impact 4.2-2 in Section 4.2, Air Quality, would help reduce the environmental effects of intensified site use on land uses adjacent to the site.</p>	<p>R4.6-5: Mitigation Measures R4.6-5a and b will become conditions of approval of the ARP; as such, their implementation and effectiveness will be monitored by the Marin County DPW.</p>	<p>Upon submittal of Conforming Amended Reclamation Plan, within 60 days of permit approval, and ongoing during quarry operations and reclamation.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan, and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these standards.</p>
<p>P4.6-6: The Amended Surface Mining and Quarrying Permit would allow for an intensification of quarry operations beyond 1982 levels, in excess of the Quarry's legal nonconforming use under Title 22 of the County Code.</p>	<p>P4.6-6a: The applicant proposes to limit daily truck traffic to 250 one-way trips per day (125 in and 125 out). This appears to be less than the daily average during the period 1980-1982 and within the baseline for Quarry operations.</p> <p>P4.6-6b: Quarry operations shall be limited to the levels of intensity extant in 1982, at the time that the Quarry became a legal nonconforming use. This will include the following:</p> <ul style="list-style-type: none"> • Maximum annual production shall be limited to the fluctuating baseline level of production as defined in Chapter 3, Project Description i.e., a 5-year rolling average of no more than 1,414,667 tons per year, and a maximum level of production of 1,697,600 tons in any one year; • Operations shall be limited to those in place in 1982, i.e., noise-generating operations will be limited to daylight hours on weekdays, except during a declared emergency; • Blasting shall be limited to an annual (calendar year) average of two times per week (104 times per year). 	<p>P4.6-6: The specific requirements of these Mitigation Measures shall become conditions of approval of the AQP. As such, responsibility for monitoring implementation of this mitigation measure shall lie with the Marin County DPW.</p>	<p>Upon approval of the AQP, and annually thereafter</p>	<p>Verified by Marin County DPW. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these conditions.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Noise and Vibration</p> <p>R4.7-1: Construction of a berm along the northern property line of the NE Quadrant would result in temporary construction noise (Significant) but would also result in the creation of a noise buffer for daily operations.</p> <p>R4.7-1a: All rolling vehicles at the Quarry are retrofitted with broadband backup alarms. Broad band alarms reduce nuisance noise effects by being directional (unlike conventional backup alarms), be being 5 dBA quieter than conventional back-up alarms and by generating noise that is has a less intrusive tonal quality (Brigade Electronics, 2007; Hub-4, 2007).</p> <p>R4.7-1b: Implementation of the following construction noise abatement measures would reduce the impact of temporary construction noise. Because of its temporary nature, berm construction noise impacts would be similar to those resulting from site preparation and grading of most general development projects.</p> <ul style="list-style-type: none"> The applicant shall limit berm construction to 7:00 a.m. to 5:00 p.m. Monday through Friday; Equipment and trucks used for berm construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically-attenuating shields or shrouds); All construction equipment powered by internal combustion engines shall be properly muffled and maintained; Unnecessary idling of internal combustion engines shall be prohibited. <p>P4.7-7: Continued blasting at the Quarry would expose neighbors of San Rafael Rock Quarry to vibrations that exceed human annoyance levels.</p>	<p>R4.7-1: The Marin County DPW will be responsible for monitoring adherence to noise mitigation measures. Standards and measures will be incorporated into a revised Amended Reclamation Plan.</p>	<p>R4.7-1: Upon submittal of Conforming Amended Reclamation Plan, within 60 days of permit approval, and ongoing during quarry operations and reclamation.</p>	<p>Verified by Marin County DPW, upon submittal of Conforming Amended Reclamation Plan, and ongoing during quarry operations and reclamation. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these requirements.</p>	
<p>P4.7-7: Continued blasting at the Quarry would expose neighbors of San Rafael Rock Quarry to vibrations that exceed human annoyance levels.</p>	<p>P4.7-7a: The AQP contains the following provisions to limit the adverse effects of blasting:</p> <ul style="list-style-type: none"> Blasting vibration beyond the Quarry property boundary shall be limited to a maximum peak velocity of 0.5 inches per second. The quarry shall provide 36 hours advance notification of blasting to local residents and to the County of Marin by posting the date and approximate time of scheduled blasts on a web site. 	<p>P4.7-7: As a condition of approval of the new AQP, SRRQ will be required to fund a seismic monitoring program. DPW will verify compliance with this requirement through the receipt and review of blasting reports from SRRQ.</p>	<p>Standards will apply upon approval of AQP. Blasting plan to be submitted within six months of approval of AQP.</p>	<p>Verified by Marin County DPW, on an ongoing basis. SRRQ's annual report of quarry operations and reclamation shall contain a review of their conformance with these standards.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Noise and Vibration				
P4.7-7 (cont.)	<ul style="list-style-type: none"> Blasting shall be limited to the hours of 11:30 a.m. to 1:30 p.m. Monday through Friday. No blasting is to occur on State holidays or weekends. <p>P4.7-7b: Implementation of the following would reduce the impact of vibration and air-overpressure from rock blasting activities:</p> <ul style="list-style-type: none"> Blasts should be designed to maintain a minimum scaled distance of 52.8 ft/lb^{1/2}, as defined in the Revey Associates report (Appendix J). Corresponding to the scale distance, the ground motion should not exceed 0.25 inches per second peak particle velocity. All charges should be confined with clean crushed stone of height equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report. Air-overpressure measured near residential home should never exceed 133 dBL, as measured with 2-Hz monitoring equipment. All charges should be confined with rock burden equal to or greater than 25 charge diameters, as defined on Page 21 of the Revey Associates report. <p>All blast monitoring of ground motion and air-overpressure effects done by either SRRQ personnel or third-party service providers should be done in full conformance with ISEE guidelines provided in Attachment I of the Revey Associates report (Appendix J)</p>			
Hazardous Materials				
R4.8-1: Hazardous materials transported or used onsite during proposed mining and reclamation activities (i.e., petroleum products,) could be spilled or otherwise released through improper handling or storage.	<p>R4.8-1a: SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.</p> <p>R4.8-1b: SRRQ shall maintain and periodically update its Hazardous Material Business Plan during the entire reclamation period.</p>	R4.8-1: Review of the Hazardous Materials Business Plan will be the responsibility of the Marin County DPW.	Periodic updates to be submitted and reviewed biannually.	Verified by Marin County DPW, beginning one year after approval of ARP, and every two years thereafter.

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Hazardous Materials (cont.)				
<p>P4.8-3: Transport, storage, and use of explosives could result in accidental explosions or exposure to hazardous substances.</p>	<p>P4.8-3a: As previously described under Mitigation Measure R4.8-1a, SRRQ maintains an updated Hazardous Material Business Plan that contains operator information, a hazardous material inventory, site maps, and an Emergency Response Action Plan.</p> <p>P4.8-3b: The applicant shall prepare and maintain a blasting plan that describes how the Quarry will consistently comply with applicable blasting regulations and standards of practice. The blasting plan will contain a complete description of clearing and guarding procedures; descriptions of how explosives will be safely transported, stored, and used at the site in accordance with applicable regulations; evacuation, security and fire prevention procedures; blasting equipment list, and procedures for notification of nearby receptors in the event of an accident or emergency involving explosives. The blasting plan shall incorporate the recommendations contained in the Revey Associates, Inc. report (pp. 23-24) attached as Appendix J. The blasting plan must be prepared within six months of approval of the AQP. The plan will be subject to review and approval by the County Department of Public Works.</p>	<p>P4.8-3: The Marin County DPW will be responsible for review and approval of the blasting plan.</p>	<p>Blasting plan to be submitted within six months of approval of ARP.</p>	<p>Verified by Marin County DPW, upon submittal of blasting plan; implementation of blasting plan verified during periodic site inspections and in review of annual report of quarry operations.</p>
Public Services, Utilities, and Energy				
None.				
Transportation and Traffic				
None.				
Population and Housing				
None.				
Cultural Resources				
<p>R4.12-1: Phased reclamation grading activities could result in adverse effects to prehistoric or unique archaeological resources, including those previously unidentified.</p>	<p>R4.12-1a (applies to all project phases): In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be</p>	<p>R4.12-1a: In the event of discovery, the Marin County DPW staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered</p>	<p>Upon approval of ARP and continuing for the duration of reclamation activities.</p>	<p>Verified by Marin County DPW on an as-needed basis. The Quarry shall include in its annual report to the County any instance of discovery of cultural resources in the course of quarry</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>R4.12-1 (cont.)</p>	<p>contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and shall submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Agency Director.</p> <p>R4.12-1b (applies to Phase 4 of reclamation grading): The applicant shall retain the services of a qualified archaeological consultant who has expertise in California prehistory to review reclamation grading plans and identify areas of potential concern, including previously undisturbed or minimally disturbed areas. The archeological consultant shall monitor all ground-disturbing or vegetation removal activities in identified areas of concern during construction to ensure that any previously undiscovered cultural resources are properly identified and preserved or otherwise mitigated in accordance with prevailing professional standards and Public Resources Code §21083.2. If an intact archaeological deposit is encountered, all soil-disturbing activities in the vicinity of the deposit will cease. The archaeological monitor will be empowered to redirect crews and heavy equipment until the deposit is evaluated. The monitor will immediately notify the Marin County Department of Public Works of the encountered archaeological deposit. The monitor will, after making a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, present the findings of this assessment to Marin County. If Marin County, in consultation with the archaeological monitor, determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, the applicant shall take steps to:</p>	<p>during site preparation or construction activities on any part of the project site, the Marin County DPW staff shall verify that a registered archaeologist has been retained to assess the site and had submitted a written evaluation to the Agency Director advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If human remains are encountered, the DPW staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.</p> <p>R4.12-1b: Prior to issuance of the Phase 4 Grading Permit for ground disturbing reclamation activities, the applicant will present to Marin County DPW written procedures for compliance with Mitigation Measure R4.12-1b. Compliance monitoring, and any consultations and approvals by the County required in the above mitigation measures, will be the responsibility of the Marin County.</p>	<p>Upon issuance of Phase 4 grading permit</p>	<p>operations or reclamation, and how Mitigation Measure R4.12-1a was implemented.</p> <p>Verified by Marin County DPW, during Phase 4 reclamation.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>Cultural Resources (cont.)</p> <p>R4.12-1 (cont.)</p> <p>R4.12-3: Construction of the top soil stockpile fill area "F" under Phase 1 of the proposed project would demolish or substantially alter the c. 1910 Caretaker's Residence, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5.</p>	<p>Mitigation Measures</p> <ul style="list-style-type: none"> • Redesign the project to avoid any adverse effects on the significant archaeological resource; or • Develop and implement an archaeological data recovery program (ADRP) (unless the archaeologist determines that the resource is of greater interpretive than research significance and that interpretive use of the resource is feasible). If the circumstances warrant an archaeological data recovery program, an ADRP will be conducted that will preserve and recover important archeological data from the find, to the extent that adverse effects will be avoided. The project archaeologist will consult with Marin County to determine the scope of the ADRP. The archaeologist will prepare a draft ADRP that will be submitted to Marin County and the state Office of Historic Preservation for review and approval. The ADRP will identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain (i.e., the ADRP will identify the scientific/historical research questions that are applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions). Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods will not be applied to portions of the archaeological resources if nondestructive methods are practical. <p>R4.12-3a: The project sponsor shall relocate the top soil stockpile fill area "F" under Phase 1 of the proposed project, to avoid potentially adverse effects to the Caretaker's Residence. The fill area could be relocated either to the east or to the west of this potentially eligible historic resource, or split into two smaller stockpiles, to avoid the resource.</p> <p>R4.12-3b: Prior to commencement of Phase 1 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing stockpiles and haul routes, and protection of historic resources. The plan will clearly show how the Caretaker's Residence and other potentially eligible historic resources will be protected and preserved.</p>	<p>R4.12-3: The Marin County DPW will be responsible for review, approval, and monitoring implementation of these mitigation measures.</p>	<p>Plans for preservation of the Caretaker's Residence shall be included in a conforming ARP, to be submitted within 60 days of AQP approval. Detailed grading plans showing preservation of this structure to be submitted with application for Phase 1 grading permit.</p>	<p>Verified by Marin County DPW, during review of Phase 1 grading permit application, and during Phase 1 grading.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
<p>R4.12-4: Construction of the surcharge berm under Phase 2 of the proposed project would demolish or substantially alter the McNear's Brickyard c. 1902 Boarding House and Office, two potentially eligible historic resources pursuant to California Environmental Quality Act Section 15064.5.</p>	<p>R4.12-4a: The project sponsor shall relocate and/or redesign the surcharge berm proposed under Phase 2 of the proposed project, to avoid potentially adverse impacts to the Boarding House and Office structures. The north-south leg of the berm could be narrowed to avoid these resources, allowing more fill to occur on the east-west portion of the berm. To ensure adherence to this mitigation measure, prior to commencement of Phase 2 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing the precise location of the surcharge berm, as well as areas that will be used to support construction of the berm. The plan will clearly show how the Boarding House and Office structures and other potentially eligible historic resources will be protected and preserved.</p> <p>R4.12-4b: If relocation or alteration of the surcharge berm will affect the geotechnical properties of the site required for intended post-reclamation development, the applicant shall revise the conceptual design for the NW Quadrant Reclamation Plan accordingly.</p>	<p>R4.12-4: The Marin County DPW and the Marin County Community Development Agency will be responsible for review, approval, and monitoring implementation of the plan specified in Mitigation Measure R4.12-4a.</p>	<p>Plans for preservation of the Boarding House and Office shall be included in a conforming ARP, to be submitted within 60 days of AQP approval. Detailed grading plans showing preservation of these structures to be submitted with application for Phase 2 grading permit.</p>	<p>Verified by Marin County DPW, during review of Phase 2 grading permit application, and during Phase 2 grading.</p>
<p>R4.12-5: Reclamation activities in the SW Quadrant under Phase 3 of the phased grading plan may demolish or substantially alter the former c. 1935 U.S. Army Signal House, a potentially eligible historic resource pursuant to California Environmental Quality Act Section 15064.5.</p>	<p>R4.12-5a: The project sponsor shall redesign the reclamation activities in the SW and NW Quadrants under Phase 3 of the proposed project to avoid potentially adverse impacts to the former c. 1935 U.S. Army Signal House. The southernmost limits of the reclamation activity area could be reduced by approximately 100 feet to avoid this historic resource, potentially allowing more reclamation activities to occur on the northern, eastern, or western portions of SW-3.</p> <p>R4.12-5b: The provisions of Mitigation Measures R4.12-3 and R4.12-4a to protect the Caretaker's residence and the McNear's Brickyard Boarding House and Office shall be kept in place for Phase 3 reclamation grading.</p> <p>R4.12-5c: To ensure adherence to mitigation measures R4.12-5a and b, prior to commencement of Phase 3 reclamation grading, the applicant shall submit a detailed plan to the Marin County Department of Public Works detailing reclamation grading activities. The plan will clearly show and describe how the affected potentially historic resources, including the c. 1935 U.S. Army Signal House, the</p>	<p>R4.12-5: The Marin County DPW and the Marin County Community Development Agency will be responsible for review, approval, and monitoring implementation of the plan specified in Mitigation Measure R4.12-5c.</p>	<p>Plans for preservation of the U.S. Army Signal House shall be included in a conforming ARP, to be submitted within 60 days of AQP approval. Detailed grading plans showing preservation of these structures to be submitted with application for Phase 3 grading permit.</p>	<p>Verified by Marin County DPW, during review of Phase 3 grading permit application, and during Phase 3 grading.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Cultural Resources (cont.)				
<p>P4.12-5 (cont.)</p> <p>R4.12-6: Reclamation grading phase 4 of the 2004 Amended Reclamation Permit would demolish four potentially eligible historic buildings at McNear's Brickyard, including 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4)c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. Even with the possible retention of Hoffman Kiln #1 under the Amended Reclamation Plan, Phase 4 would additionally alter the historic setting of Hoffman Kiln #1 to the extent that it would no longer qualify for listing in the National Register of Historic Places or California Register of Historic Resources.</p>	<p>Caretaker's residence, and the McNear's Brickyard Boarding House and Office structures, as well as any other potentially eligible historic resources will be protected and preserved.</p> <p>R4.12-6a: The ARP states that one of the Hoffman Kilns and its stack may be retained in the post-reclamation development.</p> <p>R4.12-6b: The project sponsor shall revise the applicable portion of ARP04 to specify preservation of the following four historic resources: 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4) c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed. The neighborhood commercial uses proposed for the NW Quadrant shall be constructed to provide a sufficient setback to allow these structures to visually 'read' as a working brickyard, with all original components of the brickmaking industry intact.</p>	<p>R4.12-6: The Marin County DPW will be responsible for reviewing and approving revisions to ARP04 prior to project approval.</p>	<p>Plans for preservation of 1) c. 1902 Cookhouse, 2) c. 1902 Drysheds, 3) c. 1902 Hoffman Kiln #1, 4)c. 1904 Hoffman Kiln #2, and 5) c. 1910s Worker's Shed shall be included in a conforming ARP, to be submitted within 60 days of AQP approval. Detailed grading plans showing preservation of these structures to be submitted with application for Phase 4 grading permit.</p>	<p>Verified by Marin County DPW, during review of Phase 4 grading permit application, and during Phase 4 grading.</p>
<p>P4.12-9: Continued quarrying at the project site could adversely affect prehistoric or unique archaeological resources, including those previously unidentified.</p>	<p>P4.12-9: In the event that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, all work at the vicinity of the discovered site shall stop and the project sponsor shall contact the Marin County Environmental Coordinator immediately. If human remains are encountered, the County Coroner must also be contacted. A registered archaeologist, chosen by the County and paid for by the project sponsor, shall assess the site and submit a written evaluation to the Community Development Agency Director advancing appropriate conditions to protect the site and the resources discovered. State law designates procedures should human remains be encountered. If the remains are deemed to be Native American and prehistoric, the Coroner must contact the Native American Heritage Commission so that a "Most Likely Descendant" can be designated. No work at the site may recommence without approval of the Agency Director.</p>	<p>P4.12-9: In the event of discovery, the Marin County Community Development Agency staff shall verify that a report has been submitted and all construction work has been stopped. In the event that the report indicates that any human remains, artifacts, or other indicators of prehistoric or historic use of the parcel are encountered during site preparation or construction activities on any part of the project site, the Marin County CDA staff shall verify that a registered archaeologist has been retained to assess the site and had submitted a written evaluation to the Agency Director advancing appropriate conditions to protect the site and the resources discovered before work commences on the site. If</p>	<p>Upon approval of AQP and continuing for the duration of reclamation activities.</p>	<p>Verified by Marin County DPW on an as-needed basis. The Quarry shall include in its annual report to the County any instance of discovery of cultural resources in the course of quarry operations or reclamation, and how Mitigation Measure P4.12-9 was implemented.</p>

**SAN RAFAEL ROCK QUARRY ARP AND AQP (Continued)
MITIGATION MONITORING AND REPORTING PROGRAM**

Environmental Impact	Mitigation Measures	Mitigation Monitoring and Reporting Measures	When Implemented	Verified by and Date
Cultural Resources (cont.)				
P4.12-9 (cont.)		human remains are encountered, the CDA staff shall verify that the County Coroner has been contacted and that all future work is carried out in accordance with the mitigation measures.		

Key:

- AQP – Amended Quarry Permit
- ARP – Amended Reclamation Plan
- BAAQMD – Bay Area Air Quality Management District
- BCDC – Bay Conservation and Development Commission
- CDA – Community Development Agency
- CDFG – California Department of Fish and Game
- DPW – Department of Public Works
- RWQCB – Regional Water Quality Control Board
- SRRQ – San Rafael Rock Quarry
- USACE – US Army Corps of Engineers



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

California Environmental Quality Act Air Quality Guidelines



*Note: This May 2017 version of the Guidelines includes revisions made to the Air District's 2010 Guidelines to address the California Supreme Court's 2015 opinion in Cal. Bldg. Indus. Ass'n vs. Bay Area Air Quality Mgmt. Dist., 62 Cal.4th 369. **The May 2017 CEQA Guidelines update does not address outdated references, links, analytical methodologies or other technical information that may be in the Guidelines or Thresholds Justification Report. The Air District is currently working to update any outdated information in the Guidelines.** Please see the CEQA webpage at <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa> for status updates on the Air District's CEQA Guidelines or contact Jaclyn Winkel at jwinkel@baaqmd.gov for further information.*

May 2017



California Environmental Quality Act

Air Quality Guidelines

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ACRONYMS AND ABBREVIATIONS

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
AB	Assembly Bill
AB 1807	Tanner Air Toxics Act
AB 2588	Air Toxics Hot Spots Information and Assessment Act of 1987
ABAG	Association of Bay Area Governments
AMS	American Meteorological Society
APS	Alternative Planning Strategy
AQP	Air Quality Plan
ARB	California Air Resources Board
ATCM	air toxics control measures
BAAQMD	Bay Area Quality Management District
BACT	Best Available Control Technology
BMPs	Best Management Practices
CCA	Community Choice Aggregation
CAAQS	California Ambient Air Quality Standards
CALINE4	California Line Source Dispersion Model
CAP	criteria air pollutants
CARE	Community Air Risk Evaluation
CAPCOA	California Air Pollution Control Officers Association
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CalRecycle	The California Department of Resources Recycling and Recovery (formally the California Integrated Waste Management Board)
CFC	Chlorofluorocarbon
CH ₄	methane
CHAPIS	Community Health Air Pollution Information System
CO	carbon monoxide
CO Protocol	Carbon Monoxide Protocol
CO ₂	Carbon dioxide
CO _{2e}	carbon dioxide equivalent
CRA	California Resources Agency



DOE	Department of Energy
du	dwelling units
EIR	Environmental Impact Report
EMFAC	On-Road Mobile-Source Emission Factors
EPA	U.S. Environmental Protection Agency
FAR	Floor Area Ratio
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments of 1990
GHG	greenhouse gas(es)
GRP	General Reporting Protocol
GVW	gross vehicle weight
GWP	global warming potential
H ₂ S	hydrogen sulfide
HEPA	High Efficiency Particulate Arresting (filter)
HI	Hazard Index
HRA	health risk assessment
HVAC	Heating, Ventilation, and Air Conditioning System
IPCC	Intergovernmental Panel on Climate Change
ISR	Indirect Source Review
ksf	thousand square feet
kwh	Kilowatt hour
lb/acre-day	pound per disturbed acre per day
lb/day	pounds per day
lb/kwh	pounds per kilowatt hour
LCFS	Low-Carbon Fuel Standard
LVW	loaded vehicle weight
MACT	maximum available control technology
mg	million gallons
MMT	million metric tons
mph	miles per hour
MPO	Metropolitan Planning Organizations
MT	metric tons
MTC	Metropolitan Transportation Commission
N ₂ O	nitrous oxide
NAAQS	National Ambient Air Quality Standards



NESHAP	national emissions standards for hazardous air pollutants
NH ₃	mercaptan, ammonia
NOA	Naturally Occurring Asbestos
NOP	Notice of Preparation
NO _x	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor's Office of Planning and Research
PM	particulate matter
PM ₁₀	respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less
PM _{2.5}	fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
ppm	parts per million
PUC	Public Utilities Commission
RoadMod	Roadway Construction Emissions Model
ROG	reactive organic gases
RTP	Regional Transportation Plan
SB	Senate Bill
SCS	Sustainable Communities Strategy
SF ₆	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO ₂	sulfur dioxide
SP	Service Population
SSIM	Sustainable Systems Integration Model
TAC	toxic air contaminant
T-BACT	Toxic Best Available Control Technology
TBPs	Toxic Best Practices
tpy	tons per year
UC	University of California
URBEMIS	Urban Land Use Emissions Model
VMT	vehicle miles traveled
VT	vehicle trips
yd ³	cubic yards
yr	Year



1. INTRODUCTION

1.1. PURPOSE OF GUIDELINES

The purpose of the Bay Area Air Quality Management District (BAAQMD or District) California Environmental Quality Act (CEQA) Guidelines is to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the San Francisco Bay Area Air Basin (SFBAAB). The Guidelines provides BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements. These revised Guidelines supersede the BAAQMD's previous CEQA guidance titled *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans* (BAAQMD 1999).

Land development plans and projects have the potential to generate harmful air pollutants that degrade air quality and increase local exposure. The Guidelines contain instructions on how to evaluate, measure, and mitigate air quality impacts generated from land development construction and operation activities. The Guidelines focus on criteria air pollutant, greenhouse gas (GHG), toxic air contaminant, and odor emissions generated from plans or projects.

The Guidelines are intended to help lead agencies navigate through the CEQA process. The Guidelines for implementation of the Thresholds are for information purposes only to assist local agencies. Recommendations in the Guidelines are advisory and should be followed by local governments at their own discretion. These Guidelines may inform environmental review for development projects in the Bay Area, but do not commit local governments or the Air District to any specific course of regulatory action. The Guidelines offer step-by-step procedures for a thorough environmental impact analysis of adverse air emissions due to land development in the Bay Area.

1.1.1. BAAQMD's Role in Air Quality

BAAQMD is the primary agency responsible for assuring that the National and California Ambient Air Quality Standards (NAAQS and CAAQS, respectively) are attained and maintained in the Bay Area. BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the southern portions of Solano and Sonoma counties, as shown in Figure 1-1. The Air District's responsibilities in improving air quality in the region include: preparing plans for attaining and maintaining air quality standards; adopting and enforcing rules and regulations; issuing permits for stationary sources of air pollutants; inspecting stationary sources and responding to citizen complaints; monitoring air quality and meteorological conditions; awarding grants to reduce mobile emissions; implementing public outreach campaigns; and assisting local governments in addressing climate change.

BAAQMD takes on various roles in the CEQA process, depending on the nature of the proposed project, including:

Lead Agency – BAAQMD acts as a Lead Agency when it has the primary authority to implement or approve a project, such as when it adopts air quality plans for the region, issues stationary source permits, or adopts rules and regulations.

Responsible Agency – BAAQMD acts as a Responsible Agency when it has limited discretionary authority over a portion of a project, but does not have the primary discretionary authority of a Lead Agency. As a Responsible Agency, BAAQMD may coordinate the environmental review process with the lead agency regarding BAAQMD's permitting process, provide comments to the Lead Agency regarding potential impacts, and recommend mitigation measures.





Source: ESRI Satellite 2009

Bay Area Air Quality Management District Jurisdictional Boundaries

Figure 1-1



Commenting Agency – BAAQMD may act as a Commenting Agency when it is not a Lead or Responsible Agency (i.e., it does not have discretionary authority over a project), but when it may have concerns about the air quality impacts of a proposed project or plan. As a Commenting Agency, BAAQMD may review environmental documents prepared for development proposals and plans in the region, such as local general plans, and provide comments to the Lead Agency regarding the adequacy of the air quality impact analysis, determination of significance, and mitigation measures proposed.

BAAQMD prepared the CEQA Guidelines to assist lead agencies in air quality analysis, as well as to promote sustainable development in the region. The CEQA Guidelines support lead agencies in analyzing air quality impacts and offers numerous mitigation measures and general plan policies to implement smart growth and transit oriented development, minimize construction emissions, and reduce population exposure to air pollution risks.

1.2. GUIDELINE COMPONENTS

The recommendations in the CEQA Guidelines should be viewed as minimum considerations for analyzing air quality impacts. Lead agencies are encouraged to tailor the air quality impact analysis to meet the needs of the local community and may conduct refined analysis that utilize more sophisticated models, more precise input data, innovative mitigation measures, and/or other features. The Guidelines contain the following sections:

Introduction – Chapter 1 provides a summary of the purpose of the Guide, and an overview of BAAQMD responsibilities.

Thresholds of Significance – Chapter 2 outlines the current thresholds or significance for determining the significance of air quality impacts.

Screening Criteria – Chapter 3 provides easy reference tables to determine if your project may have potentially significant impacts requiring a detailed analysis.

Assessing and Mitigating Impacts – Chapters 4 through 9 describe assessment methods and mitigation measures for operational-related, local community risk and hazards, local carbon monoxide (CO), odors, construction-related, and plan-level impacts.

Appendix A – Provides construction assessment tools.

Appendix B – Provides detailed air quality modeling instructions.

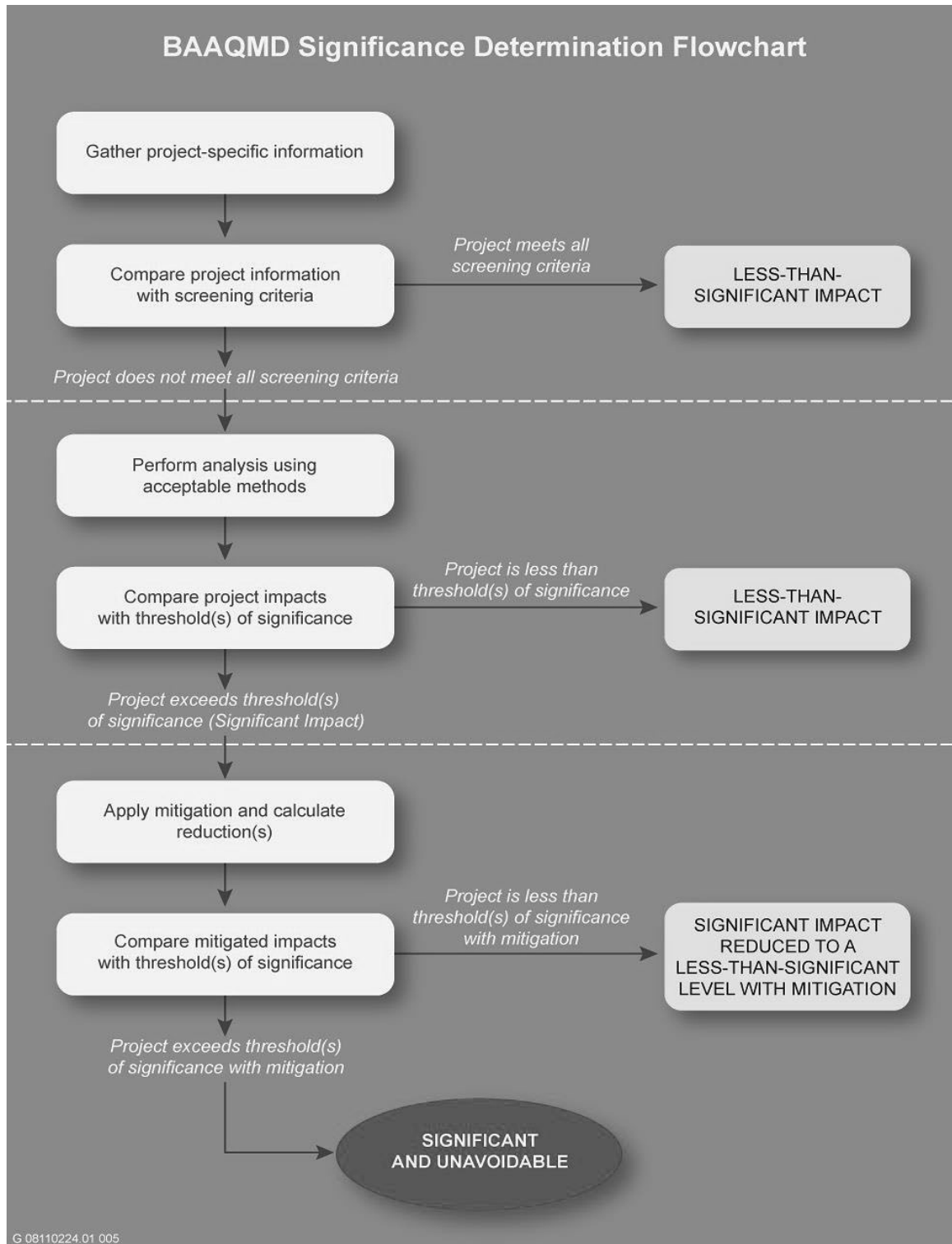
Appendix C – Outlines sample environmental setting information.

Appendix D – Contains justification statements for BAAQMD-adopted thresholds of significance.

Appendix E – Provides a glossary of terms used throughout this guide.

1.2.1. How To Use The Guidelines

Figure 2-1 illustrates general steps for evaluating a project or plan's air quality impacts. The first step is to determine whether the air quality evaluation is for a project or plan. Once identified, the project should be compared with the appropriate construction and operational screening criteria listed in Chapter 2. There are no screening criteria for plans.



General Steps for Determining Significance of Air Quality Impacts

Figure 1-2



If the project meets the screening criteria and is consistent with the methodology used to develop the screening criteria, then its air quality impacts may be considered less than significant. Otherwise, lead agencies should evaluate potential air quality impacts of projects (and plans) as explained in Chapters 4 through 9. These Chapters describe how to analyze air quality impacts from criteria air pollutants, GHGs, local community risk and hazards, and odors associated with construction activity and operations of a project or plan.

If, after proper analysis, the project or plan's air quality impacts are found to be below the significance thresholds, then the air quality impacts may be considered less than significant. If not, the Lead Agency should implement appropriate mitigation measures to reduce associated air quality impacts. Lead agencies are responsible for evaluating and implementing all feasible mitigation measures in their CEQA document.

The mitigated project or plan's impacts are then compared again to the significance thresholds. If a project succeeded in mitigating its adverse air quality impacts below the corresponding thresholds, air quality impacts may be considered less than significant. If a project still exceeds the thresholds, the Air District strongly encourages the lead agency to consider project alternatives that could lessen any identified significant impact, including a no project alternative in accordance with CEQA Guidelines section 15126.6(e).

1.2.2. Early Consultation

The District encourages local jurisdictions and project applicants to address air quality issues as early as possible in the project planning stage. Addressing land use and site design issues while a proposed project is still in the conceptual stage increases opportunities to incorporate project design features to minimize land use compatibility issues and air quality impacts. By the time a project enters the CEQA process, it is usually more costly and time-consuming to redesign the project to incorporate mitigation measures. Early consultation may be achieved by including a formal step in the jurisdiction's development review procedures or simply by discussing air quality concerns at the planning counter when a project proponent makes an initial contact regarding a proposed development. Regardless of the specific procedures a local jurisdiction employs, the objective should be to incorporate features into a project that minimize air quality impacts before significant resources (public and private) have been devoted to the project.

The following air quality considerations warrant particular attention during early consultation between Lead Agencies and project proponents:

1. land use and design measures to encourage alternatives to the automobile, conserve energy and reduce project emissions;
2. land use conflicts and exposure of sensitive receptors to odors, toxics and criteria pollutants; and,
3. applicable District rules, regulations and permit requirements.



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PART I: THRESHOLDS OF SIGNIFICANCE & PROJECT SCREENING

2. THRESHOLDS OF SIGNIFICANCE

The SFBAAB is currently designated as a nonattainment area for state and national ozone standards and national particulate matter ambient air quality standards. SFBAAB's nonattainment status is attributed to the region's development history. Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is unnecessary. The analysis to assess project-level air quality impacts should be as comprehensive and rigorous as possible.

Similar to regulated air pollutants, GHG emissions and global climate change also represent cumulative impacts. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. Climate change impacts may include an increase in extreme heat days, higher concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts. No single project could generate enough GHG emissions to noticeably change the global average temperature. The combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts.



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BAAQMD's approach to developing a *Threshold of Significance* for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions needed to move us towards climate stabilization. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. Refer to Table 2-1 for a summary of Air Quality CEQA Thresholds and to Appendix D for *Thresholds of Significance* documentation.



Table 2-1 Air Quality CEQA Thresholds of Significance*			
Pollutant	Construction-Related	Operational-Related	
Project-Level			
Criteria Air Pollutants and Precursors (Regional)	Average Daily Emissions (lb/day)	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82 (exhaust)	82	15
PM _{2.5}	54 (exhaust)	54	10
PM ₁₀ /PM _{2.5} (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
GHGs – Projects other than Stationary Sources	None	Compliance with Qualified GHG Reduction Strategy OR 1,100 MT of CO ₂ e/yr OR 4.6 MT CO ₂ e/SP/yr (residents+employees)	
GHGs –Stationary Sources	None	10,000 MT/yr	
Risk and Hazards for new sources and receptors (Individual Project)*	Same as Operational Thresholds**	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from property line of source or receptor	
Risk and Hazards for new sources and receptors (Cumulative Threshold)*	Same as Operational Thresholds**	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM _{2.5} : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from property line of source or receptor	
Accidental Release of Acutely Hazardous Air Pollutants*	None	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	
Odors*	None	5 confirmed complaints per year averaged over three years	



Table 2-1 Air Quality CEQA Thresholds of Significance*		
Pollutant	Construction-Related	Operational-Related
Plan-Level		
Criteria Air Pollutants and Precursors	None	1. Consistency with Current Air Quality Plan control measures, and 2. Projected VMT or vehicle trip increase is less than or equal to projected population increase
GHGs	None	Compliance with Qualified GHG Reduction Strategy OR 6.6 MT CO ₂ e/SP/yr (residents + employees)
Risks and Hazards*	None	1. Overlay zones around existing and planned sources of TACs (including adopted Risk Reduction Plan areas) and 2. Overlay zones of at least 500 feet from all freeways and high volume roadways
Accidental Release of Acutely Hazardous Air Pollutants	None	None
Odors*	None	Identify the location, and include policies to reduce the impacts, of existing or planned sources of odors
Regional Plans (Transportation and Air Quality Plans)		
GHGs, Criteria Air Pollutants and Precursors, and Toxic Air Contaminants	None	No net increase in emissions
<p>CEQA = California Environmental Quality Act; CO = carbon monoxide; CO₂e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO₂ = sulfur dioxide; SP = service population; TACs = toxic air contaminants; TBP = toxic best practices; tons/day = tons per day; tpy = tons per year; yr = year; TBD: to be determined.</p> <p>*The receptor thresholds were the subject of litigation in <i>California Building Industry Association v. Bay Area Air Quality Management District</i> (2015) 62 Cal. 4th 369. The use of the receptor thresholds is discussed in section 2.8 of these Guidelines.</p> <p>** The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.</p>		

2.1. CRITERIA AIR POLLUTANTS AND PRECURSORS – PROJECT LEVEL

Table 2-2 presents the *Thresholds of Significance* for operational-related criteria air pollutant and precursor emissions. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. If daily average or annual emissions of operational-

related criteria air pollutants or precursors would exceed any applicable *Threshold of Significance* listed in Table 2-2, the proposed project would result in a cumulatively significant impact.

Pollutant/Precursor	Maximum Annual Emissions (tpy)	Average Daily Emissions (lb/day)
ROG	10	54
NO _x	10	54
PM ₁₀	15	82
PM _{2.5}	10	54

Notes: tpy = tons per year; lb/day = pounds per day; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.
Refer to Appendix D for support documentation.

2.2. GREENHOUSE GASES – PROJECT LEVEL

The *Thresholds of Significance* for operational-related GHG emissions are:

- For land use development projects, the threshold is compliance with a qualified GHG Reduction Strategy; or annual emissions less than 1,100 metric tons per year (MT/yr) of CO₂e; or 4.6 MT CO₂e/SP/yr (residents + employees). Land use development projects include residential, commercial, industrial, and public land uses and facilities.
- For stationary-source projects, the threshold is 10,000 metric tons per year (MT/yr) of CO₂e. Stationary-source projects include land uses that would accommodate processes and equipment that emit GHG emissions and would require an Air District permit to operate.

If annual emissions of operational-related GHGs exceed these levels, the proposed project would result in a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact to global climate change.

2.3. LOCAL COMMUNITY RISK AND HAZARD IMPACTS – PROJECT LEVEL

The *Thresholds of Significance* for local community risk and hazard impacts are identified below, which apply to the siting of a new source. Local community risk and hazard impacts are associated with TACs and PM_{2.5} because emissions of these pollutants can have significant health impacts at the local level. If emissions of TACs or fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less (PM_{2.5}) exceed any of the *Thresholds of Significance*





listed below, the proposed project would result in a significant impact.

- Non-compliance with a qualified risk reduction plan; or
- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 would be a cumulatively considerable contribution; or
- An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) annual average $\text{PM}_{2.5}$ would be a cumulatively considerable contribution.

Cumulative Impacts

A project would have a cumulative considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000 foot radius from the fence line of a source plus the contribution from the project, exceeds the following:

- Non-compliance with a qualified risk reduction plan; or
- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0; or
- 0.8 $\mu\text{g}/\text{m}^3$ annual average $\text{PM}_{2.5}$.

A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius.

2.4. LOCAL CARBON MONOXIDE IMPACTS – PROJECT LEVEL

Table 2-3 presents the *Thresholds of Significance* for local CO emissions, the 1- and 8-hour California Ambient Air Quality Standards (CAAQS) of 20.0 parts per million (ppm) and 9.0 ppm, respectively. By definition, these represent levels that are protective of public health. If a project would cause local emissions of CO to exceed any of the *Thresholds of Significance* listed below, the proposed project would result in a significant impact to air quality.

Table 2-3 Thresholds of Significance for Local Carbon Monoxide Emissions	
CAAQS Averaging Time	Concentration (ppm)
1-Hour	20.0
8-Hour	9.0
Refer to Appendix D for support documentation.	

2.5. ODOR IMPACTS – PROJECT LEVEL

The *Thresholds of Significance* for odor impacts are qualitative in nature. A project that would result in the siting of a new source should consider the screening level distances and the complaint history of the odor sources:

- Projects that would site a new odor source farther than the applicable screening distance shown in Table 3-3 from an existing receptor, would not likely result in a significant odor impact.

- A type of odor source with five (5) or more confirmed complaints in the new source area per year averaged over three years is considered to have a significant impact on receptors within the screening distance shown in Table 3-3.

Facilities that are regulated by the CalRecycle agency (e.g. landfill, composting, etc) are required to have Odor Impact Minimization Plans (OIMP) in place and have procedures that establish fence line odor detection thresholds. The Air District recognizes a Lead Agency’s discretion under CEQA to use established odor detection thresholds as thresholds of significance for CEQA review for CalRecycle regulated facilities with an adopted OIMP. Refer to *Chapter 7 Assessing and Mitigating Odor Impacts* for further discussion of odor analysis.

2.6. CONSTRUCTION-RELATED IMPACTS – PROJECT LEVEL

2.6.1. Criteria Air Pollutants and Precursors

Table 2-4 presents the *Thresholds of Significance* for construction-related criteria air pollutant and precursor emissions. If daily average emissions of construction-related criteria air pollutants or precursors would exceed any applicable *Threshold of Significance* listed in Table 2-4, the project would result in a significant cumulative impact.



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Pollutant/Precursor	Daily Average Emissions (lb/day)
ROG	54
NO _x	54
PM ₁₀	82*
PM _{2.5}	54*

* Applies to construction exhaust emissions only.
Notes: CO = carbon monoxide; lb/day = pounds per day; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; SO₂ = sulfur dioxide. Refer to Appendix D for support documentation.

2.6.2. Greenhouse Gases

The District does not have an adopted *Threshold of Significance* for construction-related GHG emissions. However, the Lead Agency should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals, as required by the Public Resources Code, Section 21082.2. The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable.



2.6.3. Local Community Risk and Hazards

The *Threshold of Significance* for construction-related local community risk and hazard impacts is the same as that for project operations. Construction-related TAC and PM impacts should be addressed on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity to off-site receptors, as applicable. The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.

2.7. THRESHOLDS OF SIGNIFICANCE FOR PLAN-LEVEL IMPACTS

The *Thresholds of Significance* for plans (e.g., general plans, community plans, specific plans, regional plans, congestion management plans, etc.) within the SFBAAB are summarized in Table 2-5 and discussed separately below.

Criteria Air Pollutants and Precursors	Construction: none Operational: Consistency with Current AQP and projected VMT or vehicle trip increase is less than or equal to projected population increase.
GHGs	Construction: none Operational: 6.6 MT CO ₂ e/SP/yr (residents & employees) or a Qualified GHG Reduction Strategy. The efficiency threshold should only be applied to general plans. Other plans, e.g. specific plans, congestion management plans, etc., should use the project-level threshold of 4.6 CO ₂ e/SP/yr.
Local Community Risk and Hazards	Land use diagram identifies special overlay zones around existing and planned sources of TACs and PM _{2.5} , including special overlay zones of at least 500 feet (or Air District-approved modeled distance) on each side of all freeways and high-volume roadways, and plan identifies goals, policies, and objectives to minimize potentially adverse impacts.
Odors	Identify locations of odor sources in plan; identify goals, policies, and objectives to minimize potentially adverse impacts.
Regional Plans (transportation and air quality plans)	No net increase in emissions of GHGs, Criteria Air Pollutants and Precursors, and Toxic Air Contaminants. Threshold only applies to regional transportation and air quality plans.
<p>* The receptor thresholds were the subject of litigation in <i>California Building Industry Association v. Bay Area Air Quality Management District</i> (2015) 62 Cal. 4th 369. The use of the receptor thresholds is discussed in section 2.8 of these Guidelines.</p> <p>Notes: AQP = Air Quality Plan; CO₂e = carbon dioxide equivalent; GHGs = greenhouse gases; MT = metric tons; SP = service population; TACs = toxic air contaminants; yr = year; PM_{2.5}= fine particulate matter</p> <p>Refer to Appendix D for support documentation.</p>	

2.7.1. Criteria Air Pollutants and Precursor Emissions

Proposed plans (except regional plans) must show the following over the planning period of the plan to result in a less than significant impact:

- Consistency with current air quality plan control measures.
- A proposed plan’s projected VMT or vehicle trips (VT) (either measure may be used) increase is less than or equal to its projected population increase.

2.7.2. Greenhouse Gases

The *Threshold of Significance* for operational-related GHG impacts of plans employs either a GHG efficiency-based metric (per Service Population [SP]), or a GHG Reduction Strategy option, described in Section 4.3.



The *Thresholds of Significance* options for plan level GHG emissions are:

- A GHG efficiency metric of 6.6 MT per SP per year of carbon dioxide equivalent (CO₂e). If annual maximum emissions of operational-related GHGs exceed this level, the proposed plan would result in a significant impact to global climate change.
- Consistency with an adopted GHG Reduction Strategy. If a proposed plan is consistent with an adopted GHG Reduction Strategy that meets the standards described in Section 4.3, the plan would be considered to have a less than significant impact. This approach is consistent with the plan elements described in the State CEQA Guidelines, Section 15183.5.

2.7.3. Local Community Risk and Hazards

The *Thresholds of Significance* for plans with regard to community risk and hazard impacts are:

1. The land use diagram must identify:
 - a. Special overlay zones around existing and planned sources of TACs and PM (including adopted risk reduction plan areas); and
 - b. Special overlay zones of at least 500 feet (or Air District-approved modeled distance) on each side of all freeways and high-volume roadways.
2. The plan must also identify goals, policies, and objectives to minimize potential impacts and create overlay zones around sources of TACs, PM, and hazards.

Although the Risk and Hazard Thresholds recommend evaluating the impacts of locating new development in areas subject to high levels of TACs and PM, the California Supreme Court determined in 2015 that, as a general rule, CEQA does not require this analysis. Section 2.8 below discusses the Supreme Court's decision with respect to the use of the Risk and Hazard Thresholds.

2.7.4. Odors

The *Thresholds of Significance* for plans with regard to odor impacts are to identify locations of odor sources in a plan and the plan must also identify goals, policies, and objectives to minimize potentially adverse impacts.

2.7.5. Regional Plans

The *Thresholds of Significance* for regional plans is to achieve a no net increase in emissions of criteria pollutants and precursors, GHG, and toxic air contaminants. This threshold applies only to regional transportation and air quality plans.



2.8 Receptor Thresholds

The Receptor Thresholds in these Guidelines address the analysis of exposing new receptors to existing sources of toxic air pollution and odors. These Thresholds were the subject of litigation brought by the California Building Industry Association. The California Supreme Court's decision in that litigation states that: "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents . . . Despite the statute's evident concern with protecting the environment and human health, its relevant provisions are best read to focus almost entirely on how projects affect the environment." The Supreme Court upheld "evaluating a project's potentially significant exacerbating effects on existing environmental hazards . . . Because this type of inquiry still focuses on the project's impacts on the environment—how a project might worsen existing conditions—directing an agency to evaluate how such worsened conditions could affect a project's future users or residents is entirely consistent with this focus and with CEQA as a whole."

The Supreme Court also determined that CEQA requires an analysis of exposing new receptors to existing environmental hazards "in several specific contexts involving certain airport (§ 21096) and school construction projects (§ 21151.8), and some housing development projects (§§ 21159.21, subs. (f), (h), 21159.22, subs. (a), (b)(3), 21159.23, subd. (a)(2)(A), 21159.24, subd. (a)(1), (3), 21155.1, subd. (a)(4), (6))." These provisions "constitute specific exceptions to CEQA's general rule requiring consideration only of a project's effect on the environment, not the environment's effects on project users."

The Supreme Court also indicated that nothing in CEQA prevents local agencies from considering the impact of locating new development in areas subject to existing environmental hazards. However, the Court of Appeal explained "CEQA cannot be used by a lead agency to require a developer or other agency to obtain an EIR or implement mitigation measures solely because the occupants or users of a new project would be subjected to the levels of emissions specified, an agency may do so voluntarily on its own project and may use the Receptor Thresholds for guidance." The Court of Appeal also explained that, under CEQA, the Receptor Thresholds should not be applied to "routinely assess the effect of existing environmental conditions on future users or occupants of a project." The courts did not address the extent to which agencies could rely on their police power, general plans, or other regulatory authority outside of CEQA to require mitigation to address existing environmental hazards. For more information on planning approaches to addressing the impacts of locating new development in areas subject to existing air pollution, please see "Planning Healthy Places."
<http://www.baaqmd.gov/plans-and-climate/planning-healthy-places>

Under the appropriate circumstances described above, the District recommends the following Receptor Thresholds:

Table 2-6
Receptor Thresholds

<p>Risks and Hazards (Individual Project)</p>	<p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM2.5 increase: >0.3 µg/m3 annual average <u>Zone of Influence:</u> 1,000-foot radius from property line of receptor</p>
<p>Risks and Hazards (Cumulative Threshold)</p>	<p>Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM2.5: > 0.8 µg/m3 annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from property line of receptor</p>
<p>Accidental Release of Acutely Hazardous Air Pollutants</p>	<p>New receptors locating near stored or used acutely hazardous materials considered significant</p>
<p>Odors</p>	<p>5 confirmed complaints per year averaged over three years</p>



3. SCREENING CRITERIA

The screening criteria identified in this section are **not thresholds of significance**. The Air District developed screening criteria to provide lead agencies and project applicants with a conservative indication of whether the proposed project could result in potentially significant air quality impacts. If all of the screening criteria are met by a proposed project, then the lead agency or applicant would not need to perform a detailed air quality assessment of their project's air pollutant emissions. These screening levels are generally representative of new development on greenfield sites without any form of mitigation measures taken into consideration. In addition, the screening criteria in this section do not account for project design features, attributes, or local development requirements that could also result in lower emissions. For projects that are mixed-use, infill, and/or proximate to transit service and local services, emissions would be less than the greenfield type project that these screening criteria are based on.

If a project includes emissions from stationary source engines (e.g., back-up generators) and industrial sources subject to Air District Rules and Regulations, the screening criteria should not be used. The project's stationary source emissions should be analyzed separately from the land use-related indirect mobile- and area-source emissions. Stationary-source emissions are not included in the screening estimates given below and, for criteria pollutants, must be added to the indirect mobile- and area-source emissions generated by the land use development and compared to the appropriate Thresholds of Significance. Greenhouse gas emissions from permitted stationary sources should not be combined with operational emissions, but compared to a separate stationary source greenhouse gas threshold.

3.1. OPERATIONAL-RELATED IMPACTS

3.1.1. Criteria Air Pollutants and Precursors

The screening criteria developed for criteria pollutants and precursors were derived using the default assumptions used by the Urban Land Use Emissions Model (URBEMIS). If the project has sources of emissions not evaluated in the URBEMIS program the screening criteria should not be used. If the project meets the screening criteria in Table 3-1, the project would not result in the generation of operational-related criteria air pollutants and/or precursors that exceed the *Thresholds of Significance* shown in Table 2-2. Operation of the proposed project would therefore result in a less-than-significant cumulative impact to air quality from criteria air pollutant and precursor emissions.

3.1.2. Greenhouse Gases

The screening criteria developed for greenhouse gases were derived using the default emission assumptions in URBEMIS and using off-model GHG estimates for indirect emissions from electrical generation, solid waste and water conveyance. If the project has other significant sources of GHG emissions not accounted for in the methodology described above, then the screening criteria should not be used. Projects below the applicable screening criteria shown in Table 3-1 would not exceed the 1,100 MT of CO₂e/yr GHG threshold of significance for projects other than permitted stationary sources.

If a project, including stationary sources, is located in a community with an adopted qualified GHG Reduction Strategy, the project may be considered less than significant if it is consistent with the GHG Reduction Strategy. A project must demonstrate its consistency by identifying and implementing all applicable feasible measures and policies from the GHG Reduction Strategy into the project.



**Table 3-1
Operational-Related Criteria Air Pollutant and Precursor Screening Level Sizes**

Land Use Type	Operational Criteria Pollutant Screening Size	Operational GHG Screening Size	Construction-Related Screening Size
Single-family	325 du (NOX)	56 du	114 du (ROG)
Apartment, low-rise	451 du (ROG)	78 du	240 du (ROG)
Apartment, mid-rise	494 du (ROG)	87 du	240 du (ROG)
Apartment, high-rise	510 du (ROG)	91 du	249 du (ROG)
Condo/townhouse, general	451 du (ROG)	78 du	240 du (ROG)
Condo/townhouse, high-rise	511 du (ROG)	92 du	252 du (ROG)
Mobile home park	450 du (ROG)	82 du	114 du (ROG)
Retirement community	487 du (ROG)	94 du	114 du (ROG)
Congregate care facility	657 du (ROG)	143 du	240 du (ROG)
Day-care center	53 ksf (NOX)	11 ksf	277 ksf (ROG)
Elementary school	271 ksf (NOX)	44 ksf	277 ksf (ROG)
Elementary school	2747 students (ROG)	-	3904 students (ROG)
Junior high school	285 ksf (NOX)	-	277 ksf (ROG)
Junior high school	2460 students (NOX)	46 ksf	3261 students (ROG)
High school	311 ksf (NOX)	49 ksf	277 ksf (ROG)
High school	2390 students (NOX)	-	3012 students (ROG)
Junior college (2 years)	152 ksf (NOX)	28 ksf	277 ksf (ROG)
Junior college (2 years)	2865 students (ROG)	-	3012 students (ROG)
University/college (4 years)	1760 students (NOX)	320 students	3012 students (ROG)
Library	78 ksf (NOX)	15 ksf	277 ksf (ROG)
Place of worship	439 ksf (NOX)	61 ksf	277 ksf (ROG)
City park	2613 acres (ROG)	600 acres	67 acres (PM10)
Racquet club	291 ksf (NOX)	46 ksf	277 ksf (ROG)
Racquetball/health	128 ksf (NOX)	24 ksf	277 ksf (ROG)
Quality restaurant	47 ksf (NOX)	9 ksf	277 ksf (ROG)
High turnover restaurant	33 ksf (NOX)	7 ksf	277 ksf (ROG)
Fast food rest. w/ drive thru	6 ksf (NOX)	1 ksf	277 ksf (ROG)
Fast food rest. w/o drive thru	8 ksf (NOX)	1 ksf	277 ksf (ROG)
Hotel	489 rooms (NOX)	83 rooms	554 rooms (ROG)
Motel	688 rooms (NOX)	106 rooms	554 rooms (ROG)
Free-standing discount store	76 ksf (NOX)	15 ksf	277 ksf (ROG)
Free-standing discount superstore	87 ksf (NOX)	17 ksf	277 ksf (ROG)
Discount club	102 ksf (NOX)	20 ksf	277 ksf (ROG)
Regional shopping center	99 ksf (NOX)	19 ksf	277 ksf (ROG)
Electronic Superstore	95 ksf (NOX)	18 ksf	277 ksf (ROG)
Home improvement superstore	142 ksf (NOX)	26 ksf	277 ksf (ROG)
Strip mall	99 ksf (NOX)	19 ksf	277 ksf (ROG)
Hardware/paint store	83 ksf (NOX)	16 ksf	277 ksf (ROG)
Supermarket	42 ksf (NOX)	8 ksf	277 ksf (ROG)
Convenience market (24 hour)	5 ksf (NOX)	1 ksf	277 ksf (ROG)
Convenience market with gas pumps	4 ksf (NOX)	1 ksf	277 ksf (ROG)
Bank (with drive-through)	17 ksf (NOX)	3 ksf	277 ksf (ROG)
General office building	346 ksf (NOX)	53 ksf	277 ksf (ROG)



**Table 3-1
Operational-Related Criteria Air Pollutant and Precursor Screening Level Sizes**

Land Use Type	Operational Criteria Pollutant Screening Size	Operational GHG Screening Size	Construction-Related Screening Size
Office park	323 ksf (NOX)	50 ksf	277 ksf (ROG)
Government office building	61 ksf (NOX)	12 ksf	277 ksf (ROG)
Government (civic center)	149 ksf (NOX)	27 ksf	277 ksf (ROG)
Pharmacy/drugstore w/ drive through	49 ksf (NOX)	10 ksf	277 ksf (ROG)
Pharmacy/drugstore w/o drive through	48 ksf (NOX)	10 ksf	277 ksf (ROG)
Medical office building	117 ksf (NOX)	22 ksf	277 ksf (ROG)
Hospital	226 ksf (NOX)	39 ksf	277 ksf (ROG)
Hospital	334 beds (NOX)	84 ksf	337 beds (ROG)
Warehouse	864 ksf (NOX)	64 ksf	259 ksf (NOX)
General light industry	541 ksf (NOX)	121 ksf	259 ksf (NOX)
General light industry	72 acres (NOX)	-	11 acres (NOX)
General light industry	1249 employees (NOX)	-	540 employees (NOX)
General heavy industry	1899 ksf (ROG)	-	259 ksf (NOX)
General heavy industry	281 acres (ROG)	-	11 acres (NOX)
Industrial park	553 ksf (NOX)	65 ksf	259 ksf (NOX)
Industrial park	61 acres (NOX)	-	11 acres (NOX)
Industrial park	1154 employees (NOX)	-	577 employees (NOX)
Manufacturing	992 ksf (NOX)	89 ksf	259 ksf (NOX)

Notes: du = dwelling units; ksf = thousand square feet; NO_x = oxides of nitrogen; ROG = reactive organic gases. Screening levels include indirect and area source emissions. Emissions from engines (e.g., back-up generators) and industrial sources subject to Air District Rules and Regulations embedded in the land uses are not included in the screening estimates and must be added to the above land uses. Refer to Appendix D for support documentation. Source: Modeled by EDAW 2009.

3.2. COMMUNITY RISK AND HAZARD IMPACTS

Please refer to Chapter 5 for discussion of screening criteria for local community risk and hazard impacts.

3.3. CARBON MONOXIDE IMPACTS

This preliminary screening methodology provides the Lead Agency with a conservative indication of whether the implementation of the proposed project would result in CO emissions that exceed the *Thresholds of Significance* shown in Table 2-3.

The proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria is met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.



2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

3.4. ODOR IMPACTS

Table 3-3 presents odor screening distances recommended by BAAQMD for a variety of land uses. Projects that would site a new odor source or a new receptor farther than the applicable screening distance shown in Table 3-3 from an existing receptor or odor source, respectively, would not likely result in a significant odor impact. The odor screening distances in Table 3-3 should not be used as absolute screening criteria, rather as information to consider along with the odor parameters and complaint history. Refer to *Chapter 7 Assessing and Mitigating Odor Impacts* for comprehensive guidance on significance determination.

Land Use/Type of Operation	Project Screening Distance
Wastewater Treatment Plant	2 miles
Wastewater Pumping Facilities	1 mile
Sanitary Landfill	2 miles
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	2 miles
Chemical Manufacturing	2 miles
Fiberglass Manufacturing	1 mile
Painting/Coating Operations	1 mile
Rendering Plant	2 miles
Coffee Roaster	1 mile
Food Processing Facility	1 mile
Confined Animal Facility/Feed Lot/Dairy	1 mile
Green Waste and Recycling Operations	1 mile
Metal Smelting Plants	2 miles
Refer to Appendix D for support documentation.	

Facilities that are regulated by CalRecycle (e.g. landfill, composting, etc.) are required to have Odor Impact Minimization Plans (OIMP) in place and have procedures that establish fence line odor detection thresholds. The Air District recognizes a Lead Agency's discretion under CEQA to use established odor detection thresholds as thresholds of significance for CEQA review for CalRecycle regulated facilities with an adopted OIMP.



3.5. CONSTRUCTION-RELATED IMPACTS

3.5.1. Criteria Air Pollutants and Precursors

This preliminary screening provides the Lead Agency with a conservative indication of whether the proposed project would result in the generation of construction-related criteria air pollutants and/or precursors that exceed the *Thresholds of Significance* shown in Table 2-4.

If all of the following *Screening Criteria* are met, the construction of the proposed project would result in a less-than-significant impact from criteria air pollutant and precursor emissions.

1. The project is below the applicable screening level size shown in Table 3-1; and
2. All *Basic Construction Mitigation Measures* would be included in the project design and implemented during construction; and
3. Construction-related activities would not include any of the following:
 - a. Demolition;
 - b. Simultaneous occurrence of more than two construction phases (e.g., paving and building construction would occur simultaneously);
 - c. Simultaneous construction of more than one land use type (e.g., project would develop residential and commercial uses on the same site) (not applicable to high density infill development);
 - d. Extensive site preparation (i.e., greater than default assumptions used by the Urban Land Use Emissions Model [URBEMIS] for grading, cut/fill, or earth movement); or
 - e. Extensive material transport (e.g., greater than 10,000 cubic yards of soil import/export) requiring a considerable amount of haul truck activity.

3.5.2. Community Risk and Hazards

Chapter 5, *Assessing and Mitigating Local Community Risk and Hazard Impacts*, contains information on screening criteria for local risk and hazards.



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PART II: ASSESSING & MITIGATING PROJECT LEVEL IMPACTS

4. OPERATIONAL-RELATED IMPACTS

Operational emissions typically represent the majority of a project's air quality impacts. After a project is built, operational emissions, including mobile and area sources, are anticipated to occur continuously throughout the project's lifetime. Operational-related activities, such as driving, use of landscape equipment, and wood burning, could generate emissions of criteria air pollutants and their precursors, GHG, TACs, and PM. Area sources generally include fuel combustion from space and water heating, landscape maintenance equipment, and fireplaces/stoves, evaporative emissions from architectural coatings and consumer products and unpermitted emissions from stationary sources. This chapter provides recommendations for assessing and mitigating operational-related impacts for individual projects. Recommendations for assessing and mitigating operational-related impacts at the plan-level are discussed in Chapter 9. Chapter 9 also contains guidance for assessing a project's consistency with applicable air quality plans.

When calculating project emissions to compare to the thresholds of significance, lead agencies should account for reductions that would result from state, regional, and local rules and regulations. The Air District also recommends for lead agencies to consider project design features, attributes, or local development requirements as part of the project as proposed and not as mitigation measures. For example, projects that are mixed-use, infill, and/or proximate to transit service and local services, or that provide neighborhood serving commercial and retail services would have substantially lower vehicle trip rates and associated criteria pollutant and GHG emissions than what would be reflected in standard, basin-wide average URBEMIS default trip rates and emission estimates. A project specific transportation study should identify the reductions that can be claimed by projects with the above described attributes. The Air District, in association with the California Air Pollution Control Officers Association (CAPCOA), is currently developing guidance for estimating reductions in standard vehicle trip rates and vehicle miles traveled (VMT) that can be claimed for these land use types that do not develop project specific transportation studies. This additional guidance will be posted to the District website in July 2010.

To estimate a project's carbon dioxide equivalent emissions from direct and indirect emission sources, BAAQMD recommends using the BAAQMD GHG Model (BGM). The Air District developed this model to calculate GHG emissions not included in URBEMIS such as indirect emissions from electricity use and waste and direct fugitive emissions of refrigerants. The BGM is discussed in more detail in Section 4.2 below.

4.1. CRITERIA AIR POLLUTANT AND PRECURSOR EMISSIONS

4.1.1. Significance Determination

Step 1: Comparison of Project Attributes with Screening Criteria

The first step in determining the significance of operational-related criteria air pollutants and precursors is to compare the attributes of the proposed project with the applicable *Screening Criteria* listed in Chapter 3. This preliminary screening provides a conservative indication of whether operation of the proposed project would result in the generation of criteria air pollutants and/or precursors that exceed the *Thresholds of Significance* listed in Chapter 2. If all of the *Screening Criteria* are met, the operation of the proposed project would result in a less than significant impact to air quality. If the proposed project does not meet all the *Screening Criteria*, then project emissions need to be quantified.



Step 2: Emissions Quantification

If a proposed project involves the removal of existing emission sources, BAAQMD recommends subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. This net calculation is permissible only if the existing emission sources were operational at the time that the Notice of Preparation (NOP) for the CEQA project was circulated or in the absence of an NOP when environmental analysis begins, and would continue if the proposed redevelopment project is not approved. This net calculation is not permitted for emission sources that ceased to operate, or the land uses were vacated and/or demolished, prior to circulation of the NOP or the commencement of environmental analysis. This approach is consistent with the definition of baseline conditions pursuant to CEQA.



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Land Use Development Projects

For proposed land use development projects, BAAQMD recommends using the most current version of URBEMIS (which to date is version 9.2.4) to quantify operational-related criteria air pollutants and precursors. URBEMIS is a modeling tool initially developed by the California Air Resources Board for calculating air pollutant emissions from land use development projects. URBEMIS uses EMFAC emission factors and ITE trip generation rates to calculate ROG, NO_x, carbon monoxide, particulate matter, carbon dioxide, and total vehicle trips. URBEMIS is not equipped for calculating air quality impacts from stationary sources or plans. For land use projects, URBEMIS quantifies emissions from area sources (e.g., natural gas fuel combustion for space and water heating, wood stoves and fireplace combustion, landscape maintenance equipment, consumer products, and architectural coating) and operational-related emissions (mobile sources).

Appendix B contains more detailed instructions for using URBEMIS to model operational emissions.

Stationary-Source Facilities

A stationary source consists of a single emission source with an identified emission point, such as a stack at a facility. Facilities can have multiple emission point sources located on-site and sometimes the facility as a whole is referred to as a stationary source. Major stationary sources are typically associated with industrial processes, such as refineries or power plants. Minor stationary sources are typically land uses that may require air district permits, such as gasoline dispensing stations, and dry cleaning establishments. Examples of other District-permitted stationary sources include back-up diesel generators, boilers, heaters, flares, cement kilns, and other types of combustion equipment, as well as non-combustion sources such as coating or printing operations. BAAQMD is responsible for issuing permits for the construction and operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the SFBAAB. Newly modified or constructed stationary sources subject to Air District permitting may be required to implement Best Available Control Technology (BACT), which may include the installation of emissions control equipment or the implementation of administrative practices that would result in the lowest achievable emission rate. Stationary sources may also be required to offset their emissions of criteria air pollutants and precursors to be permitted. This may entail shutting down or augmenting another stationary source at the same facility. Facilities also may purchase an emissions reduction credit to offset their emissions. Any stationary source emissions remaining after the application of BACT and



offsets should be added to the indirect and area source emissions estimated above to arrive at total project emissions.

URBEMIS is not equipped to estimate emissions generated by stationary sources. Instead emissions from stationary sources should be estimated using manual calculation methods in consultation with BAAQMD. When stationary sources will be subject to BAAQMD regulations, the regulation emission limits should be used as emission factors. If BAAQMD emission limits are not applicable, alternative sources of emission factors include: EPA AP-42 emission factors for particular industrial processes, manufacturer specifications for specific equipment, throughput data (e.g., fuel consumption, rate of material feedstock input) and other specifications provided by the project engineer. To the extent possible, BAAQMD recommends that the methodology used to estimate stationary-source emissions be consistent with calculations that would need to be performed to fulfill requirements of the permitting process and provided in the CEQA document.

Step 3: Comparison of Unmitigated Emissions with Thresholds of Significance

Sum the estimated emissions for area, mobile, and stationary sources (if any) for each pollutant as explained above and compare the total average daily and annual emissions of each criteria pollutant and their precursors with the applicable *Thresholds of Significance* (refer to Table 2-2). If daily average or annual emissions of operational-related criteria air pollutants or precursors do not exceed any of the *Thresholds of Significance*, the project would result in a less than significant impact to air quality. If the quantified emissions of operational-related criteria air pollutants or precursors do exceed any applicable *Threshold of Significance*, the proposed project would result in a significant impact to air quality and CEQA requires implementation of all feasible mitigation measures.

Step 4: Mitigation Measures and Emission Reductions

Where operational-related emissions exceed applicable *Thresholds of Significance*, lead agencies are responsible for implementing all feasible mitigation measures to reduce the project's air quality impacts. Section 4.2 contains numerous examples of mitigation measures and associated emission reductions that may be applied to projects. The project's mitigated emission estimates from mitigation measures included in the proposed project or recommended by the lead agency should be quantified and disclosed in the CEQA document.

Step 5: Comparison of Mitigated Emissions with Thresholds of Significance

Compare the total average daily and annual amounts of mitigated criteria air pollutants and precursors with the applicable *Thresholds of Significance* (refer to Table 4-1). If the implementation of mitigation measures, including off-site mitigation, would reduce all operational-related criteria air pollutants and precursors to levels below the applicable *Thresholds of Significance*, the impact to air quality would be reduced to a less than significant level. Implementation of mitigation measures means that they are made conditions of project approval and included in a Mitigation Monitoring and Reporting Plan (MMRP). If mitigated levels of any criteria air pollutant or precursor would still exceed the applicable *Threshold of Significance*, the impact to air quality would remain significant and unavoidable.



Step	Emissions Source	Emissions (lb/day or tpy)*			
		ROG	NO _x	PM ₁₀	PM _{2.5}
2	Area Sources	A	A	A	A
	Mobile Sources	B	B	B	B
	Stationary Sources	C	C	C	C
	Total Unmitigated Emissions	A + B + C = D	A + B + C = D	A + B + C = D	A + B + C = D
	BAAQMD Threshold	54 lb/day or 10 tpy	54 lb/day or 10 tpy	82 lb/day or 15 tpy	54 lb/day or 10 tpy
3	Unmitigated Emissions Exceed BAAQMD Threshold?	Is D > Threshold? (If Yes, significant. Go to step 4. If No, less than significant)			
4	Mitigated Emissions	E	E	E	E
5	Mitigated Emissions Exceed BAAQMD Threshold?	Is E > Threshold? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)			

* Letters "A", "B", and "C" are used to represent numeric values that would be obtained through modeling for area and mobile sources, and by manual calculations for stationary source-emissions. "D" represents the sum of "A", "B", and "C" (i.e., unmitigated emissions). "E" represents mitigated emissions.
 Notes: lb/day = pounds per day; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; tpy = tons per year.
 Refer to Appendix D for support documentation.

4.2. GREENHOUSE GAS IMPACTS

4.2.1. Significance Determination

Step 1: Comparison of Project Attributes with Screening Criteria

The first step in determining the significance of operational-related GHG emissions is to compare the attributes of the proposed project with the applicable *Screening Criteria* (Refer to Chapter 3). If all of the *Screening Criteria* are met, the operation of the proposed project would result in a less than significant impact to global climate change. If the proposed project does not meet all the *Screening Criteria*, then project emissions need to be quantified.

If a project is located in a community with an adopted qualified GHG Reduction Strategy (described in section 4.3), the project may be considered less than significant if it is consistent with the GHG Reduction Strategy. A project must demonstrate its consistency by identifying and implementing all applicable feasible measures and policies from the GHG Reduction Strategy into the project.



Step 2: Emissions Quantification

For quantifying a project's GHG emissions, BAAQMD recommends that all GHG emissions from a project be estimated, including a project's direct and indirect GHG emissions from operations. Direct emissions refer to emissions produced from onsite combustion of energy, such as natural gas used in furnaces and boilers, emissions from industrial processes, and fuel combustion from mobile sources. Indirect emissions are emissions produced offsite from energy production and water conveyance due to a project's energy use and water consumption. See Table 4-2 for a list of GHG emission sources and types that should be estimated for projects.

Biogenic CO₂ emissions should not be included in the quantification of GHG emissions for a project. Biogenic CO₂ emissions result from materials that are derived from living cells, as opposed to CO₂ emissions derived from fossil fuels, limestone and other materials that have been transformed by geological processes. Biogenic CO₂ contains carbon that is present in organic materials that include, but are not limited to, wood, paper, vegetable oils, animal fat, and food, animal and yard waste.



The GHG emissions from permitted stationary sources should be calculated separately from a project's operational emissions. Permitted stationary sources are subject to a different threshold than land use developments. For example, if a proposed project anticipates having a permitted stationary source on site, such as a back-up generator, the GHG emissions from the generator should not be added to the project's total emissions. The generator's GHG emissions should be calculated separately and compared to the GHG threshold for stationary sources to determine its impact level.

If a proposed project involves the removal of existing emission sources, BAAQMD recommends subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. This net calculation is permissible only if the existing emission sources were operational at the time that the Notice of Preparation (NOP) for the CEQA project was circulated (or in the absence of an NOP when environmental analysis begins), and would continue if the proposed redevelopment project is not approved. This net calculation is not permitted for emission sources that ceased to operate, or the land uses were vacated and/or demolished, prior to circulation of the NOP or the commencement of environmental analysis. This approach is consistent with the definition of baseline conditions pursuant to CEQA.

BAAQMD Greenhouse Gas Model

BAAQMD recommends using URBEMIS to estimate direct CO₂ emissions from area and mobile sources. The same detailed guidance described for criteria air pollutants and precursors (Section 4.1 above) could be followed for quantifying GHG emissions as appropriate. URBEMIS estimates the modeled emissions output in units of short tons; the URBEMIS output may be converted to metric tons by multiplying the amount of short tons by 0.91.

To estimate a project's carbon dioxide equivalent emissions from direct and indirect emission sources, BAAQMD recommends using the BAAQMD GHG Model (BGM). The Air District developed this model to calculate GHG emissions not included in URBEMIS such as indirect emissions from electricity use and waste and direct fugitive emissions of refrigerants. The BGM



also adjusts for state regulations not included in URBEMIS, specifically California’s low carbon fuel rules and Pavley regulations.

The BGM imports project inputs and emission results from URBEMIS to quantify carbon dioxide equivalent emissions from additional direct and indirect sources not included in URBEMIS, such as water supply, waste disposal, electricity generation and refrigerants. The BGM also contains a range of GHG reduction strategies/mitigation measures that may be applied to projects. The BGM also adjusts emission totals to reflect reductions from adopted state regulations such as Pavley and the low carbon fuel standard. This model is available without cost and may be downloaded at: <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx>. The BGM is run using Microsoft Excel. Refer to the BGM user’s manual for detailed instructions on using the model.

Table 4-2 outlines the recommended methodologies for estimating a project’s GHG emissions.

Table 4-2 Guidance for Estimating a Project’s Operations GHG Emissions			
Emission Source	Emission Type	GHG	Methodology
Area Sources (natural gas, hearth, landscape fuel, etc.)	Direct - natural gas and fuel combustion	CO ₂ , CH ₄ , N ₂ O	URBEMIS and BGM
Transportation	Direct - fuel combustion	CO ₂ , CH ₄ , N ₂ O	URBEMIS and BGM
Electricity consumption	Indirect - electricity	CO ₂ , CH ₄ , N ₂ O	BGM
Solid waste landfill (non-biogenic emissions)*	Direct - landfill	CH ₄	BGM
Solid waste transport	Indirect - fuel combustion	CO ₂ , CH ₄ , N ₂ O	BGM
Water consumption	Indirect - electricity	CO ₂ , CH ₄ , N ₂ O	BGM
Wastewater (non-biogenic emissions)*	Indirect - electricity	CO ₂ , CH ₄ , N ₂ O	BGM
Industrial process emissions	Direct	CO ₂ , CH ₄ , N ₂ O, and refrigerants	BGM and BAAQMD permits**
Fugitive emissions	Direct	CO ₂ , CH ₄ , N ₂ O, and refrigerants	BGM

* Biogenic CO₂ emissions should not be included in the quantification of GHG emissions for a project.
 ** Industrial processes permitted by the Air District must use the methodology provided in BAAQMD rules and regulations. Other industrial process emissions, such as commercial refrigerants, should use the BGM.

CO₂ (carbon dioxide), CH₄ (methane), N₂O (nitrous oxides), and refrigerants (HFCs and PFCs).

In cases where users may need to estimate a project’s GHG emissions manually, BAAQMD recommends using ARB’s most current Local Government Operations Protocol (LGOP) as appropriate for guidance. The most current LGOP may be downloaded from ARB’s website.

Step 3: Comparison of Unmitigated Emissions with Thresholds of Significance

Sum the estimated GHG emissions from area and mobile sources and compare the total annual GHG emissions with the applicable *Threshold of Significance*. If annual emissions of operational-related GHGs do not exceed the *Threshold of Significance*, the project would result in a less than significant impact to global climate change. If annual emissions do exceed the *Threshold of Significance*, the proposed project would result in a significant impact to global climate change and will require mitigation measures for emission reductions.



Step 4: Mitigation Measures and Emission Reductions

Where operational-related emissions exceed applicable *Thresholds of Significance*, lead agencies are responsible for implementing all feasible mitigation measures to reduce the project's GHG emissions. Section 4.2 contains recommended mitigation measures and associated emission reductions. The Air District recommends using the BGM if additional reductions are needed. The air quality analysis should quantify the reduction of emissions associated with any proposed mitigation measures and include this information in the CEQA document.

Step 5: Comparison of Mitigated Emissions with Thresholds of Significance

Compare the total annual amount of mitigated GHGs with the applicable *Threshold of Significance*, as demonstrated in Table 4-3. If the implementation of project proposed or required mitigation measures would reduce operational-related GHGs to a level below either the 1,100 MT CO₂e/yr or 4.6 MT CO₂e/SP/yr *Threshold of Significance*, the impact would be reduced to a less than significant level. If mitigated levels still exceed the applicable *Threshold of Significance*, the impact to global climate change would remain significant and unavoidable.

Step	Emissions Source	Emissions (MT CO ₂ e/yr)*
2	Area Sources	A
	Mobile Sources	B
	Indirect Sources	C
	Total Unmitigated Emissions	A + B + C = D
	BAAQMD Threshold	1,100 or 4.6 MT CO ₂ e/yr/SP
3	Unmitigated Emissions Exceed BAAQMD Threshold?	Is D > 1,100/4.6? (If Yes, significant. Go to step 4. If No, less than significant)
4	Mitigated Emissions	E
5	Mitigated Emissions Exceed BAAQMD Threshold?	Is E > 1,100/4.6? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)
<p>* Letters "A", "B", and "C" are used to represent numeric values that would be obtained through modeling for area and mobile sources, and by manual calculations for indirect source-emissions. "D" represents the sum of "A", "B", and "C" (i.e., unmitigated emissions). "E" represents mitigated emissions. Notes: CO₂e = carbon dioxide equivalent; MT = metric tons; yr = year. Refer to Appendix D for support documentation.</p>		

4.3. GREENHOUSE GAS REDUCTION STRATEGIES

The Air District encourages local governments to adopt a qualified GHG Reduction Strategy that is consistent with AB 32 goals. If a project is consistent with an adopted qualified GHG Reduction Strategy that meets the standards laid out below, it can be presumed that the project will not have significant GHG emission impacts. This approach is consistent with the State CEQA Guidelines, Section 15183.5 (see text in box below).

§15183.5. Tiering and Streamlining the Analysis of Greenhouse Gas Emissions.

(a) Lead agencies may analyze and mitigate the significant effects of greenhouse gas emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review.



Project-specific environmental documents may rely on an EIR containing a programmatic analysis of greenhouse gas emissions as provided in section 15152 (tiering), 15167 (staged EIRs) 15168 (program EIRs), 15175-15179.5 (Master EIRs), 15182 (EIRs Prepared for Specific Plans), and 15183 (EIRs Prepared for General Plans, Community Plans, or Zoning).

(b) Plans for the Reduction of Greenhouse Gas Emissions. Public agencies may choose to analyze and mitigate significant greenhouse gas emissions in a plan for the reduction of greenhouse gas emissions or similar document. A plan to reduce greenhouse gas emissions may be used in a cumulative impacts analysis as set forth below. Pursuant to sections 15064(h)(3) and 15130(d), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously adopted plan or mitigation program under specified circumstances.

(1) Plan Elements. A plan for the reduction of greenhouse gas emissions should:

(A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;

(B) Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;

(C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;

(D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;

(E) Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels;

(F) Be adopted in a public process following environmental review

(2) Use with Later Activities. A plan for the reduction of greenhouse gas emissions, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. If there is substantial evidence that the effects of a particular project may be cumulatively considerable notwithstanding the project's compliance with the specified requirements in the plan for the reduction of greenhouse gas emissions, an EIR must be prepared for the project.

Standard Elements of a GHG Reduction Strategy

The Air District recommends the Plan Elements in the state CEQA Guidelines as the minimum standard to meet the GHG Reduction Strategy Thresholds of Significance option. A GHG Reduction Strategy may be one single plan, such as a general plan or climate action plan, or could be comprised of a collection of climate action policies, ordinances and programs that have been legislatively adopted by a local jurisdiction. The GHG Reduction Strategy should identify goals, policies and implementation measures that would achieve AB 32 goals for the entire community. Plans with horizon years beyond 2020 should consider continuing the downward



reduction path set by AB 32 and move toward climate stabilization goals established in Executive Order S-3-05.

To meet this threshold of significance, a GHG Reduction Strategy must include the following elements (corresponding to the State CEQA Guidelines Plan Elements):

(A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.

A GHG Reduction Strategy must include an emissions inventory that quantifies an existing baseline level of emissions and projected GHG emissions from a business-as-usual, no-plan, forecast scenario of the horizon year. The baseline year is based on the existing growth pattern defined by an existing general plan. The projected GHG emissions are based on the emissions from the existing growth pattern or general plan through to 2020, and if different, the year used for the forecast. If the forecast year is beyond 2020, BAAQMD recommends doing a forecast for 2020 to establish a trend. The forecast does not include new growth estimates based on a new or draft general plan.

When conducting the baseline emissions inventory and forecast, ARB's business-as-usual 2020 forecasting methodology should be followed to the extent possible, including the following recommended methodology and assumptions:

- The baseline inventory should include one complete calendar year of data for 2008 or earlier. CO₂ must be inventoried across all sectors (residential, commercial, industrial, transportation and waste); accounting of CH₄, N₂O, SF₆, HFC and PFC emission sources can also be included where reliable estimation methodologies and data are available.
- Business-as-usual emissions are projected in the absence of any policies or actions that would reduce emissions. The forecast should include only adopted and funded projects.
- The business-as-usual forecast should project emissions from the baseline year using growth factors specific to each of the different economic sectors: Recommendations for growth factors are included in the Air District's GHG Quantification Guidance document (explained below and available on the District's website).

The Air District's *GHG Plan Level Reduction Strategy Guidance* contains detailed recommendations for developing GHG emission inventories and projections and for quantifying emission reductions from policies and mitigation measures. This document is available at the Air District's website, <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx>.

(B) Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.

A GHG Reduction Strategy must establish a target that is adopted by legislation that meets or exceeds one of the following options, all based on AB 32 goals:



- Reduce emissions to 1990 level by 2020¹
- Reduce emissions 15 percent below baseline (2008 or earlier) emission level by 2020²
- Meet the plan efficiency threshold of 6.6 MT CO₂e/service population/year

If the target year for a GHG reduction goal exceeds 2020, then the GHG emission reduction target should be in line with the goals outlined in Executive Order S-3-05.

(C) Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.

A Strategy should identify and analyze GHG reductions from anticipated actions in order to understand the amount of reductions needed to meet its target. Anticipated actions refer to local and state policies and regulations that may be planned or adopted but not implemented. For example, ARB's Scoping Plan contains a number of measures that are planned but not yet implemented. BAAQMD recommends for the Strategy to include an additional forecast analyzing anticipated actions. Element (C), together with (A), is meant to identify the scope of GHG emissions to be reduced through Element (D).

(D) Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.

The GHG Reduction Strategy should include mandatory and enforceable measures that impact new development projects, such as mandatory energy efficiency standards, density requirements, etc. These measures may exist in codes or other policies and may be included in the Strategy by reference.

The GHG Reduction Strategy should include quantification of expected GHG reductions from each identified measure or categories of measures (such as residential energy efficiency measures, bike/pedestrian measures, recycling measures, etc.), including disclosure of calculation methods and assumptions. Quantification should reflect annual GHG reductions and demonstrate how the GHG reduction target will be met. The Strategy should specify which measures apply to new development projects.

(E) Monitor the plan's progress

To ensure that all new development projects are incorporating all applicable measures contained within the GHG Reduction Strategy, the Strategy should include an Implementation Plan containing the following:

- Identification of which measures apply to different types of new development projects, discerning between voluntary and mandatory measures.
- Mechanism for reviewing and determining if all applicable mandatory measures are being adequately applied to new development projects.
- Identification of implementation steps and parties responsible for ensuring implementation of each action.

¹ Specified target in AB 32 legislation

² From "Climate Change Scoping Plan", Executive Summary page 5



- Schedule of implementation identifying near-term and longer-term implementation steps.
- Procedures for monitoring and updating the GHG inventory and reduction measures every 3-5 years before 2020 and submitting annual implementation updates to the jurisdiction's governing body.
- Annual review and reporting on the progress of implementation of individual measures, including assessment of how new development projects have been incorporating Strategy measures. Review should also include an assessment of the implementation of Scoping Plan measures in order to determine if adjustments to local Strategy must be made to account for any shortfalls in Scoping Plan implementation.

(F) Adopt the GHG Reduction Strategy in a public process following environmental review

A GHG Reduction Strategy should undergo an environmental review which may include a negative declaration or EIR.

If the GHG Reduction Strategy consists of a number of different elements, such as a general plan, a climate action plan and/or separate codes, ordinances and policies, each element that is applicable to new development projects would have to complete an environmental review in order to allow tiering for new development projects.

Sustainable Communities Strategy (SCS) or Alternative Planning Strategy

If a project is located within an adopted Sustainable Communities Strategy or Alternative Planning Strategy, the GHG emissions from cars and light duty trucks do not need to be analyzed in the environmental analysis. This approach is consistent with the State CEQA Guidelines, Section 15183.5(c). This approach only applies to certain residential and mixed use projects and transit priority projects as defined in Section 21155 of the State CEQA Guidelines.

Section 15183.5(c): Special Situations. As provided in Public Resources Code sections 21155.2 and 21159.28, environmental documents for certain residential and mixed use projects, and transit priority projects, as defined in section 21155, that are consistent with the general use designation, density, building intensity, and applicable policies specified for the project area in an applicable sustainable communities strategy or alternative planning strategy need not analyze global



warming impacts resulting from cars and light duty trucks. A lead agency should consider whether such projects may result in GHG emissions resulting from other source, however, consistent with these Guidelines.

Section 21155: A transit priority project shall (1) contain at least 50 percent residential use, based on total building square footage and, if the project contains between 26 percent and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (2) provide a minimum net density of at least 20 dwelling units per acre; and (3) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan. A major transit stop is as defined in Section 21064.3, except that, for purposes of this section, it also includes major transit stops that are included in the applicable regional transportation plan. For purposes of this section, a high quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours. A project shall be considered to be within one-half mile of a major transit stop or high-quality transit corridor if all parcels within the project have not more than 25 percent of their area farther than one-half mile from the stop or corridor and if not more than 10 percent of the residential units or 100 units, whichever is less, in the project are farther than one-half mile from the stop or corridor.

4.4. MITIGATING OPERATIONAL-RELATED IMPACTS

The following mitigation measures would reduce operational-related emissions of criteria air pollutants, precursors, and GHGs from mobile, area, and stationary sources. Additional mitigation measures may be used, including off-site measures, provided their mitigation efficiency is justified. Where a range of emission reduction potential is given for a measure, the Lead Agency should provide justification for the mitigation reduction efficiency assumed for the project. If mitigation does not bring a project back within the threshold requirements, the project could be cumulatively significant and could be approved only with a Statement of Overriding Considerations and a showing that all feasible mitigation measures have been implemented.

Reductions from mitigation measures should be scaled proportionally to their sector of project-generated emissions. For example, if a measure would result in a 50 percent reduction in residential natural gas consumption, but only 20 percent of a project's emissions are associated with natural gas consumption, and only 10 percent of a project's emissions are from residential land uses, then the scaled reduction would equal one percent ($50\% * 20\% * 10\% = 1\%$).

Once all emission reductions are scaled by their applicable sector and land use, they should be added together for the total sum of emission reductions. Once all emission reductions are scaled by their applicable sector and land use, they should be added together for the total sum of emission reductions.

The Air District prefers for project emissions to be reduced to their extent possible onsite. For projects that are not able to mitigate onsite to a level below significance, offsite mitigation measures serve as a feasible alternative. Recent State's CEQA Guidelines amendments allow for offsite measures to mitigate a project's emissions, (Section 15126.4(c)(4)).

In implementing offsite mitigation measures, the lead agency must ensure that emission reductions from identified projects are real, permanent through the duration of the project, enforceable, and are equal to the pollutant type and amount of the project impact being offset. BAAQMD recommends that offsite mitigation projects occur within the nine-county Bay Area in order to reduce localized impacts and capture potential co-benefits. Offsite mitigation for PM and toxics emission reductions should occur within a five mile radius to the project site.



Another feasible mitigation measure the Air District is exploring establishing is an offsite mitigation program to assist lead agencies and project applicants in achieving emission reductions. A project applicant would enter into an agreement with the Air District and pay into an Air District fund. The Air District would commit to reducing the type and amount of emission indentified in the agreement. The Air District would identify, implement, and manage offsite mitigation projects.

The following tables list feasible mitigation measures for consideration in projects. The estimated emission reductions are a work in progress and the Air District will continue to improve guidance on quantifying the mitigation measures.

URBEMIS Mitigation Measures for Operational Mobile Source Emissions					
Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
Mix of Uses	-3% to 9%	CAPs, GHGs	Mobile sources	-3 when no housing or employment centers within 1/2 mile	Residential: % reduction is taken from base trips (9.57) and subtracted from ITE trip generation; Nonresidential: % reduction from ITE trip generation
Local serving retail within 1/2 mile of project	2%	CAPs, GHGs	Mobile sources	Uses lower end of reported research to avoid double counting with mix of uses measure	
Transit Service	0% to 15%	CAPs, GHGs	Mobile sources		
Bike & Pedestrian	0%–9%	CAPs, GHGs	Mobile sources	Credit is given based on intersection density, sidewalk completeness, and bike network completeness; No reduction if entire area within 1/2 mile is single use	
Affordable Housing	0%–4%	CAPs, GHGs	Mobile sources		
Transportation Demand Management Parking, Transit Passes					
Daily Parking Charge	0%–25%	CAPs, GHGs	Only resident/ employee trips, no visitor/ shopper trips		
Parking Cash-Out	0%–12.5%	CAPs, GHGs		Shoup, Donald. 2005. Parking Cash Out. American Planning Association. Chicago, IL.	
Free Transit Passes	25% of Transit Service Reduction	CAPs, GHGs			
Telecommuting					
Employee Telecommuting Program	1%–100%	CAPs, GHGs	Mobile sources, Worker Trips only		
Compressed Work Schedule 3/36	1%–40%	CAPs, GHGs			
Compressed Work Schedule 4/40	1%–20%	CAPs, GHGs			
Compressed Work Schedule 9/80	1%–10%	CAPs, GHGs			



URBEMIS Mitigation Measures for Operational Mobile Source Emissions

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
Other Transportation Demand Measures					
Secure Bike Parking (at least 1 space per 20 vehicle spaces)	At least 3 elements: 1% reduction, plus 5% of the reduction for transit and pedestrian/bike friendliness; At least 5 elements: 2% reduction, plus 10% of the reduction for transit and pedestrian/bike friendliness	CAPs, GHGs	Mobile sources, Worker Trips only		
Showers/Changing Facilities Provided					
Guaranteed Ride Home Program Provided					
Car-Sharing Services Provided					
Information Provided on Transportation Alternatives (Bike Schedules, Maps)					
Dedicated Employee Transportation Coordinator					
Carpool Matching Program					
Preferential Carpool/Vanpool Parking					
Parking Supply	0%–50%	CAPs, GHGs	Mobile sources		
On Road Trucks	As input by user in URBEMIS	CAPs, GHGs	Mobile sources		

URBEMIS Mitigation Measures for Operational Area-Source Emissions

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes
Increase Energy Efficiency Beyond Title 24	Same as % improvement over Title 24	CAPs, GHGs	Natural gas sector in URBEMIS for applicable land use only	User should specify baseline year for the Title 24 standards
Electrically powered landscape equipment and outdoor electrical outlets	Same as % of landscape equipment emissions	CAPs, GHGs	Landscape emissions: residential only	
Low VOC architectural coatings	Same as % VOC reduction in applicable coatings (Interior/Exterior)	ROG only	Architectural coating	



NON-URBEMIS Energy Efficiency Mitigation Measures

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
Plant shade trees within 40 feet of the south side or within 60 feet of the west sides of properties.	30%	GHGs	R,C A/C Electricity	USDA Forest Service, Pacific Northwest Research Station. "California Study Shows Shade Trees Reduce Summertime Electricity Use." Science Daily 7 January 2009. 20 February 2009 < http://www.sciencedaily.com/releases/2009/01/090105150831.htm >.	Electricity-related measures reduce CAPs off-site, but they are not typically quantified as part of a CEQA analysis.
Require cool roof materials (albedo >= 30)	34%	GHGs	C A/C Electricity	U.S. EPA Cool Roof Product Information, Available: < http://www.epa.gov/heatisl and/resources/pdf/CoolRoofsCompendium.pdf >	
	69%	GHGs	R A/C Electricity		
Install green roofs	1%	GHGs	R,C A/C Electricity	Reductions are based on the Energy & Atmosphere credits (EA Credit 2) documented in the Leadership in Energy & Environmental Design (LEED), Green Building Rating System for New Constructions and Major Renovations, Version 2.2, October 2005. The reduction assumes that a vegetated roof is installed on a least 50% of the roof area or that a combination high albedo and vegetated roof surface is installed that meets the following standard: (Area of SRI Roof/0.75)+(Area of vegetated roof/0.5) >= Total Roof Area.	
Require smart meters and programmable thermostats	10%	CAPs, GHGs	R, C electricity and natural gas space heating	U. S. Environmental Protection Agency. 2009. Programmable Thermostat. http://www.energystar.gov/ia/new_homes/features/ProgThermostats1-17-01.pdf	



NON-URBEMIS Energy Efficiency Mitigation Measures

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
Meet GBC standards in all New construction	17%	GHGs	R electricity	California Energy Commission [CEC] 2007. Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings	
	7%	GHGs	C electricity		
	9%	CAPs, GHGs	R natural gas		
	3%	CAPs, GHGs	C natural gas		
Retrofit existing buildings to meet CA GBC standards	38%	GHGs	R electricity	California Energy Commission [CEC] 2003. Impact Analysis 2005 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings; California Energy Commission [CEC] 2007. Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings	
	12%	GHGs	C electricity		
	18%	CAPs, GHGs	R natural gas		
	12%	CAPs, GHGs	C natural gas		
Install solar water heaters	70%	CAPs, GHGs	R natural gas water heating	Energy Star. 2009. Solar Water Heater. http://www.energystar.gov/ia/new_homes/features/WaterHtrs_062906.pdf ; Department of Energy. California Energy Commission [CEC] 2007. Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings	Cannot take credit for both solar and tank-less water heater measures
	70%	CAPs, GHGs	C natural gas water heating		
Install tank-less water heaters	35%	CAPs, GHGs	R natural gas water heating	Tankless Water Heater. 2008. Available: http://www.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12820	
	35%	CAPs, GHGs	C natural gas water heating		
Install solar panels on residential and commercial buildings	100%	GHGs	R, C electricity		



NON-URBEMIS Energy Efficiency Mitigation Measures

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
100% increase in diversity of land use mix	5%	CAPs, GHGs	Mobile sources	Ewing, Reid, et al. 2001. <i>Travel and the Built Environment: A Synthesis</i> . Transportation Research Record 1780. Paper No. 01-3515 as cited in Urban Land Institute. 2008. <i>Growing Cooler</i> . ISBN: 978-0-87420-082-2. Washington, DC	
Jobs housing balance	$\text{Trip reduction} = (1 - (\text{ABS} (1.5 * \text{HH} - \text{E}) / (1.5 * \text{HH} + \text{E}) - 0.25) / 0.25) * 0.03;$ where ABS = absolute value; HH = study area households ; E = study area employment	CAPs, GHGs	Mobile sources	<i>Nelson/Nygaard Consultants. 2005. Crediting Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS. Pg 12, (adapted from Criterion and Fehr & Peers, 2001)</i>	
100% increase in design (i.e., presence of design guidelines for transit oriented development, complete streets standards)	3%	CAPs, GHGs	Mobile sources	Ewing, Reid, et al. 2001. <i>Travel and the Built Environment: A Synthesis</i> . Transportation Research Record 1780. Paper No. 01-3515 as cited in Urban Land Institute. 2008. <i>Growing Cooler</i> . ISBN: 978-0-87420-082-2. Washington, DC	



NON-URBEMIS Energy Efficiency Mitigation Measures

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
100% increase in density	5%	CAPs, GHGs	Mobile sources	Ewing, Reid, et al. 2001. <i>Travel and the Built Environment: A Synthesis</i> . Transportation Research Record 1780. Paper No. 01-3515 as cited in Urban Land Institute. 2008. <i>Growing Cooler</i> . ISBN: 978-0-87420-082-2. Washington, DC	
HVAC duct sealing	30%	GHGs	R,C A/C electricity	Sacramento Metropolitan Utilities District. 2008. Duct Sealing. Available: < http://www.pge.com/myhome/saveenergymoney/rebates/coolheat/duct/index.shtml >.	
Provide necessary infrastructure and treatment to allow use of 50% greywater/ recycled water in residential and commercial uses for outdoor irrigation	SFR: 74%*50% = 37.5%	GHGs	R electricity (water consumption)	Department of Water Resources. 2001. Statewide Indoor/Outdoor Split. Accessed December 2, 2008. Available at: < http://www.landwateruse.water.ca.gov/annualdata/urbanwateruse/2001/landuselvels.cfm?use=8 >.	
	MFR: 58% * 50% = 29%		C electricity (water consumption)		
	Commercial: 12% * 50% = 6%				
Complete streets (i.e., bike lanes and pedestrian sidewalks on both sides of streets, traffic calming features such as pedestrian bulb-outs, cross-walks, traffic circles, and elimination of physical and psychological barriers (e.g., sound walls and large arterial roadways, respectively).)	1-5%	CAPs, GHGs	Mobile sources	Dierkers, G., E. Silsbe, S. Stott, S. Winkelman, and M. Wubben. 2007. <i>CCAP Transportation Emissions Guidebook</i> . Center for Clean Air Policy. Washington, D.C. Available: < http://www.ccap.org/safe/guidebook.php >. as cited in California Air Pollution Control Officers Association (CAPCOA) 2008. <i>CEQA and Climate Change</i> .	



NON-URBEMIS Energy Efficiency Mitigation Measures

Measure	Sector Reductions	Applicable Pollutants	Sector	Notes	Additional comments
Maximize interior day light		GHGs	R, C, M		
Increase roof/ceiling insulation		CAPs, GHGs	R, C, M		
Create program to encourage efficiency improvements in rental units		CAPs, GHGs	R		
Install rainwater collection systems in residential and Commercial Buildings		GHGs	R,C,M		
Install low-water use appliances and fixtures		GHGs	R,C,M	California Air Pollution Control Officers Association (CAPCOA) 2008. CEQA and Climate Change.	
Restrict the use of water for cleaning outdoor surfaces/Prohibit systems that apply water to non-vegetated surfaces		GHGs	R,C,M	California Attorney General's Office GHG Reduction Measures	
Implement water-sensitive urban design practices in new construction		GHGs	R,C,M		

NON-URBEMIS Waste Reduction Mitigation Measures

Provide composting facilities at residential uses		GHGs	R		
Create food waste and green waste curb-side pickup service		GHGs	R,C,M		
Require the provision of storage areas for recyclables and green waste in new construction		GHGs	R,C,M		

Notes: CAPs = Criteria Air Pollutants; GHGs = Greenhouse Gases; ROG = Reactive Organic Gases; R = Residential Development; C = Commercial Development; M = Mixed Use Development; A/C = Air Conditioning; and VOC = Volatile Organic Compounds.

Source: Information compiled by EDAW 2009.



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5. LOCAL COMMUNITY RISK AND HAZARD IMPACTS³

The purpose of this Chapter is (1) to recommend methods whereby local community risk and hazard impacts from projects for both new sources and new receptors can be determined based on comparison with applicable thresholds of significance and screening criteria and (2) to recommend mitigation measures for these impacts. This chapter contains the following sections:

Section 5.2 – Presents methods for assessing single-source impacts from either an individual new source or impacts on new receptors from existing individual sources.

Section 5.3 – Discusses methods for assessing cumulative impacts from multiple sources.

Section 5.4 – Discusses methods for mitigating local community risk and hazard impacts.

The recommendations provided in this chapter apply to assessing and mitigating impacts for project-level impacts and related cumulative impacts. Refer to Chapter 9 for recommendations for assessing and mitigating local community risk and hazard impacts at the plan-level.

To assist the Lead Agency in evaluating air quality impacts at the neighborhood scale, *Thresholds of Significance* have been established for local community risks and hazards associated with TACs and PM_{2.5} with respect to siting a new source and/or receptor; as well as for assessing both individual source and cumulative multiple source impacts. These *Thresholds of Significance* focus on PM_{2.5} and TACs because these more so than other emission types pose significant health impacts at the local level as discussed separately below.

5.1. TOXIC AIR CONTAMINANTS

TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A wide range of sources, from industrial plants to motor vehicles, emit TACs. Like PM_{2.5}, TAC can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. The methods presented in this Chapter for assessing local community risk and hazard impacts only include direct TAC emissions, not those formed in the atmosphere.

The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute effects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches. For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure. Non-carcinogenic substances differ in that there is generally assumed to



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³ The use of the receptor thresholds is discussed in section 2.8 of these Guidelines



be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to non-carcinogens is expressed as a hazard index (HI), which is the ratio of expected exposure levels to an acceptable reference exposure levels.

TACs are primarily regulated through State and local risk management programs. These programs are designed to eliminate, avoid, or minimize the risk of adverse health effects from exposures to TACs. A chemical becomes a regulated TAC in California based on designation by the California Office of Environmental Health Hazard Assessment (OEHHA). As part of its jurisdiction under Air Toxics Hot Spots Program (Health and Safety Code Section 44360(b)(2)), OEHHA derives cancer potencies and reference exposure levels (RELs) for individual air contaminants based on the current scientific knowledge that includes consideration of possible differential effects on the health of infants, children and other sensitive subpopulations, in accordance with the mandate of the Children's Environmental Health Protection Act (Senate Bill 25, Escutia, Chapter 731, Statutes of 1999, Health and Safety Code Sections 39669.5 et seq.). The methodology in this Chapter reflects the approach adopted by OEHHA in May 2009, which considers age sensitivity factors to account for early life stage exposures. The specific toxicity values of each particular TAC as identified by OEHHA are listed in BAAQMD's Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.

5.1.1. Fine Particulate Matter

PM_{2.5} is a complex mixture of substances that includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust and wood smoke. PM_{2.5} can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. The methods presented in this Chapter for assessing local community risk and hazard impacts only include direct PM_{2.5} emissions, not those formed in the atmosphere.

Compelling evidence suggests that PM_{2.5} is by far the most harmful air pollutant in the SFBAAB in terms of the associated impact on public health. A large body of scientific evidence indicates that both long-term and short-term exposure to PM_{2.5} can cause a wide range of health effects (e.g., aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths). BAAQMD recommends characterizing potential health effects from exposure to directly PM_{2.5} emissions through comparison to the applicable *Thresholds of Significance*.

5.1.2. Common Source Types

Common stationary source types of TAC and PM_{2.5} emissions include gasoline stations, dry cleaners, and diesel backup generators, which are subject to BAAQMD permit requirements. The other, often more significant, common source type is on-road motor vehicles on freeways and roads such as trucks and cars, and off-road sources such as construction equipment, ships and trains. Because these common sources are prevalent in many communities, this Chapter focuses on screening tools for the evaluation of associated cumulative community risk and hazard impacts. However, it is important to note that other influential source types do exist (e.g., ports, railyards, and truck distribution centers), but these are often more complex and require more advanced modeling techniques beyond those discussed herein.

5.1.3. Area of Influence

For assessing community risks and hazards, a 1,000 foot radius is recommended around the project property boundary. BAAQMD recommends that any proposed project that includes the siting of a new source or receptor assess associated impacts within 1,000 feet, taking into account both individual and nearby cumulative sources (i.e., proposed project plus existing and foreseeable future projects). Cumulative sources represent the combined total risk values of each



individual source within the 1,000-foot evaluation zone. A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius.

The recommended methodology for assessing community risks and hazards from PM_{2.5} and TACs follows a phased approach. Within this approach, more advanced techniques, for both new sources and receptors, which require additional site specific information are presented for each progressive phase to assess risks and hazards. Each phase provides concentrations and risks that are directly comparable to the applicable *Thresholds of Significance*, although it is important to note that the use of more site specific modeling input data produces more accurate results. Also, progression from one phase to the next in a sequential fashion is not necessary and a refined modeling analysis can be conducted at any time.

5.1.4. Impacted Communities

In the Bay Area, there are a number of urban or industrialized communities where the exposure to TACs is relatively high in comparison to others. These same communities are often faced with other environmental and socio-economic hardships that further stress their residents and result in poor health outcomes. To address community risk from air toxics, the Air District initiated the Community Air Risk Evaluation (CARE) program in 2004 to identify locations with high levels of risk from TACs co-located with sensitive populations and use the information to help focus mitigation measures. Through the CARE program, the Air District developed an inventory of TAC emissions for 2005 and compiled demographic and health indicator data. According to the findings of the CARE Program, diesel PM, mostly from on and off-road mobile sources, accounts for over 80 percent of the inhalation cancer risk from TACs in the Bay Area. Figure 5-1 shows the impacted communities as of November 2009, including: the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose. For more information on, and possible revisions to, impacted communities, go to the [CARE Program](#) website.

In many cases, air quality conditions in impacted communities result in part from land use and transportation decisions made over many years. BAAQMD believes comprehensive, community-wide strategies will achieve the greatest reductions in emissions of and exposure to TAC and PM_{2.5}. BAAQMD strongly recommends that within these impacted areas local jurisdictions develop and adopt Community Risk Reduction Plans, described in Section 5.4. The goal of the Community Risk Reduction Plan is to encourage local jurisdictions to take a proactive approach to reduce the overall exposure to TAC and PM_{2.5} emissions and concentrations from new and existing sources. Local plans may also be developed in other areas to address air quality impacts related to land use decisions and ensure sufficient health protection in the community.

5.2. SINGLE SOURCE IMPACTS

5.2.1. Significance Determination

The Lead Agency shall determine whether operational-related TAC and PM_{2.5} emissions generated as part of a proposed project siting a new source or receptor would expose existing or new receptors to levels that exceed BAAQMD's applicable *Thresholds of Significance* stated below:

- Compliance with a qualified Community Risk Reduction Plan;
- An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) risk greater than 1.0 HI from a single source would be a significant cumulatively considerable contribution;

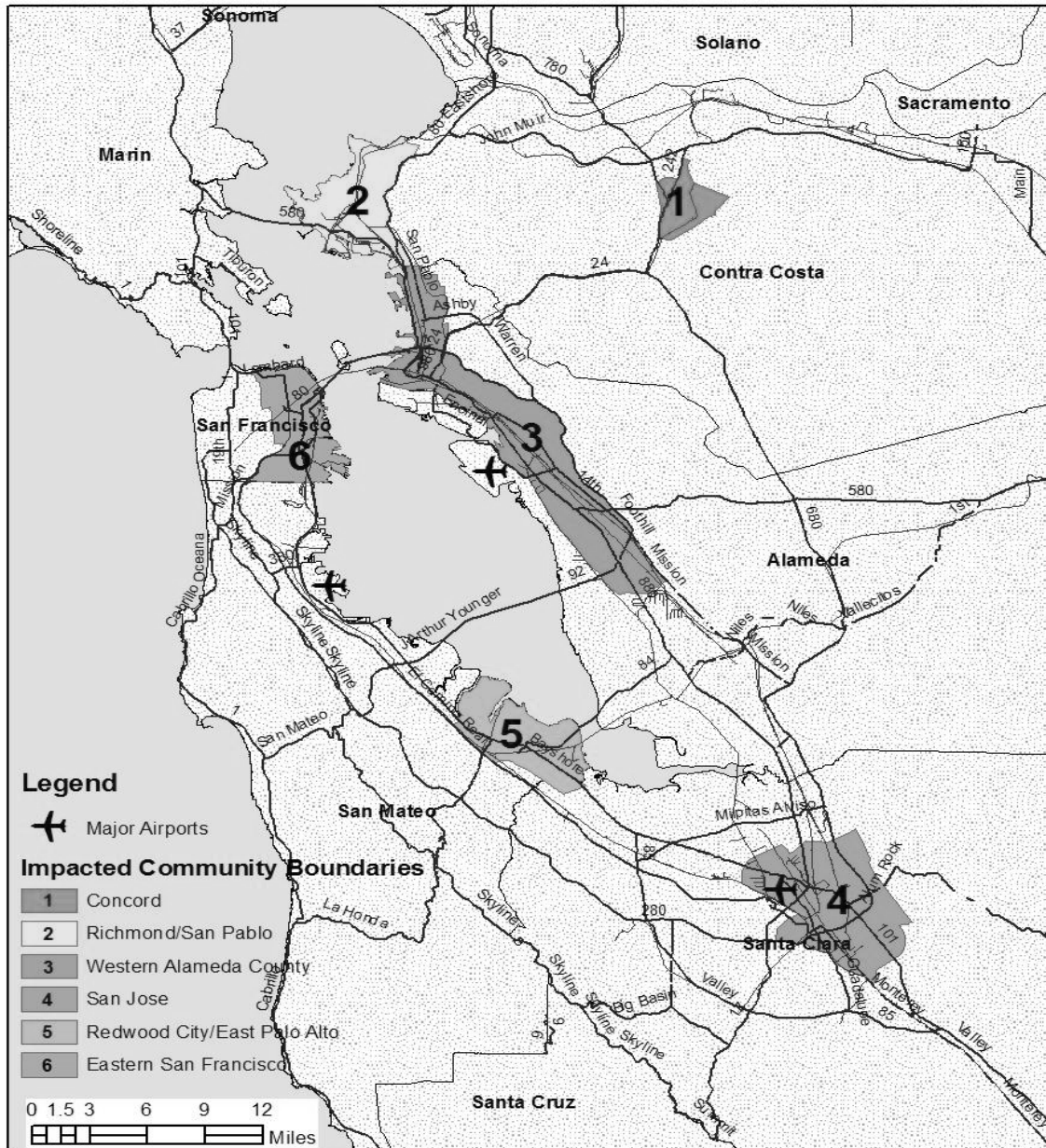


- An incremental increase of greater than $0.3 \mu\text{g}/\text{m}^3$ annual average $\text{PM}_{2.5}$ from a single source would be a significant cumulatively considerable contribution.

In all areas, but especially within impacted communities identified under BAAQMD's CARE program, the Lead Agency is encouraged to develop and adopt a Community Risk Reduction Plan. To determine whether an impacted community is located in a jurisdiction, the Lead Agency should refer to Figure 5-1 and the BAAQMD CARE web page at <http://www.baaqmd.gov/CARE/>. Please consult with BAAQMD if a more precise map is needed.

Impacted Communities

Figure 5-1



Source: BAAQMD 2009



Exposure of receptors to substantial concentrations of TACs and PM_{2.5} could occur from the following situations:

1. Siting a new TAC and/or PM_{2.5} source (e.g., diesel generator, truck distribution center, freeway) near existing or planned receptors; and
2. Siting a new receptor near an existing source of TAC and/or PM_{2.5} emissions.

BAAQMD recommendations for evaluating and making a significance determination for each of these situations are discussed separately below.

5.2.2. Siting a New Source

When evaluating whether a new source of TAC and/or PM_{2.5} emissions would adversely affect existing or future proposed receptors, a Lead Agency shall examine:

- the extent to which the new source would increase risk levels, hazard index, and/or PM_{2.5} concentrations at nearby receptors,
- whether the source would be permitted or non-permitted by the BAAQMD, and
- whether the project would implement Best Available Control Technology for Toxics (T-BACT), as determined by BAAQMD.

The incremental increase in cancer and non-cancer (chronic and acute) risk from TACs and PM_{2.5} concentrations at the affected receptors shall be assessed. As described above, the recommended methodology for assessing community risks and hazards from PM_{2.5} and TACs follows a phased approach, within which progressively more advanced techniques are presented for each phase (Figure 5-2). Each phase provides concentrations and risks that are directly comparable to the applicable *Thresholds of Significance*, although it is important to note that the use of more site specific modeling input data produces more accurate results. Also, progression from one phase to the next in a sequential fashion is not necessary and a refined modeling analysis can be conducted at any time.

For siting a new source, the first step is to determine the associated emission levels.

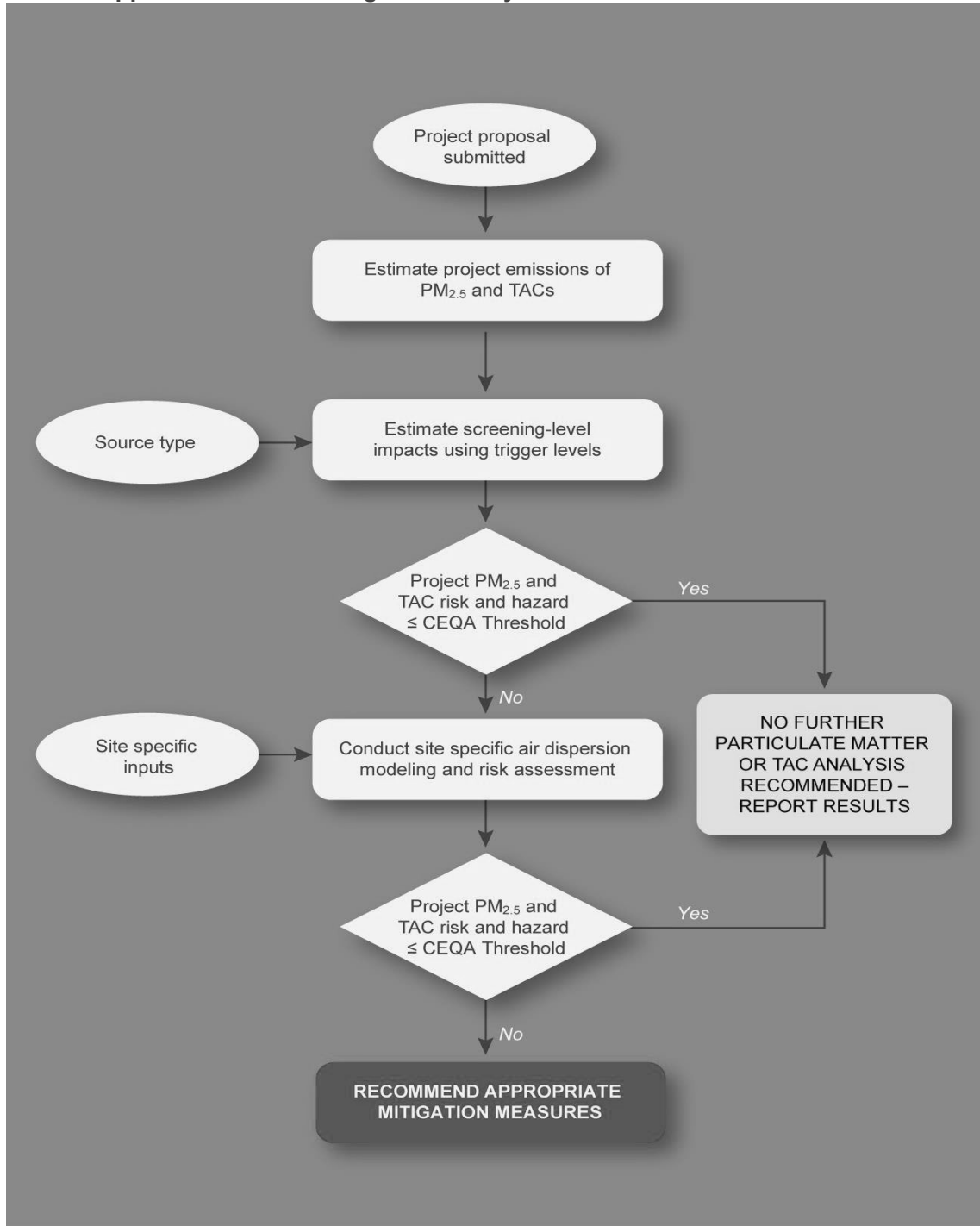
5.2.3. Sources Permitted by BAAQMD

For sources that would be permitted by BAAQMD (e.g., gas stations and back-up diesel generators) the project's type, size, or planned level of use can be used to help estimate PM_{2.5} and TAC emissions. Screening or modeling conducted as part of the permit application can be used to determine cancer and non-cancer risk and PM_{2.5} concentrations for comparing to the applicable *Thresholds of Significance*. BAAQMD can assist in determining the level of emissions associated with the new source. A Lead Agency should identify the maximally exposed existing or reasonably foreseeable future receptor.

Requirements of Toxics New Source Review (Regulation 2, Rule 5) will determine whether the project would implement T-BACT.

Figure 5-2

Phased Approach for Estimating Community Risks and Hazards – New Sources



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Concentration estimates of PM_{2.5} from screening or modeling should be compared with the *Threshold of Significance* for PM_{2.5}. If screening estimates determine PM_{2.5} concentrations from the project would not exceed the *Threshold of Significance*, no further analysis is recommended (See Figure 5-2). If emissions would exceed the *Threshold of Significance*, more refined modeling or mitigation measures to offset emission can be considered.

5.2.4. Sources Not Requiring a BAAQMD Permit

Some proposed projects would include the operation of non-permitted sources of TAC and/or PM_{2.5} emissions. For instance, projects that would attract high numbers of diesel-powered on-road trucks or use off-road diesel equipment on site, such as a distribution center, a quarry, or a manufacturing facility, would potentially expose existing or future planned receptors to substantial risk levels and/or health hazards.

For sources that would not require permits from BAAQMD (e.g., distribution centers and large retail centers) where emissions are primarily from mobile sources—the number and activity of vehicles and fleet information would be required. The latest version of the State of California’s EMFAC model is recommended for estimating emissions from on-road vehicles; the OFFROAD model is recommended for estimating emissions from off-road vehicles. For these types of new sources (not permitted by BAAQMD) screening methods are not currently available and a more refined analysis is necessary.



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If modeling estimates for community risks and hazards determine that local levels associated with the proposed project meet the applicable *Thresholds of Significance*, no further analysis is recommended. More details on project screening and recommended protocols for modeling stationary and mobile sources are presented in *Recommended Methods for Screening and Modeling Local Risks and Hazards*. This online companion document provides screening tables for emissions from on-road cars and trucks on major roadways and many existing permitted sources in the SFBAAB. It describes how to use screening tables to determine whether a site specific modeling analysis and risk assessment is required. The document also addresses sources that BAAQMD has determined to have negligible impact on health outcomes. It describes the recommended methodology for performing dispersion modeling and estimating emission factors if the project exceeds the thresholds based on the screening analysis; it describes how to calculate the potential cancer risk using age-sensitivity toxicity factors from the concentrations produced from the air modeling analysis; and it provides a sample calculation and the methodology for estimating short term, acute exposures and long term, chronic health impacts. The recommended protocols are consistent with the most current risk assessment methodology used for the BAAQMD’s *New Source Review for Toxic Air Contaminants Regulation 2, Rule 5: Toxics New Source Review* and, with few exceptions, follows the California Air Pollution Control Officers Association’s (CAPCOA) *Health Risk Assessments for Proposed Land Use Projects* (July 2009).

BAAQMD recommends that all receptors located within a 1,000 foot radius of the project’s fence line be assessed for potentially significant impacts from the incremental increase in risks or hazards from the proposed new source. A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius.



For new land uses that would host a high number of non-permitted TAC sources, such as a distribution center, the incremental increase in cancer risk shall be determined by an HRA using an acceptable air dispersion model in accordance with BAAQMD's *Recommended Methods for Screening and Modeling Local Risks and Hazards* and/or CAPCOA's guidance document titled *Health Risk Assessments for Proposed Land Use Projects*. A Lead Agency may consult HRAs that have previously been conducted for similar land uses to determine whether it assesses the incremental increase in cancer risk qualitatively or by performing an HRA. This analysis shall account for all TAC and PM emissions generated on the project site, as well as any TAC emissions that would occur near the site as a result of the implementation of the project (e.g., diesel trucks queuing outside an entrance, a high volume of trucks using a road to access a quarry or landfill).

Some proposed projects would include both permitted and non-permitted TAC sources. For instance, a manufacturing facility may include some permitted stationary sources and also attract a high volume of diesel trucks and/or include a rail yard. All sources should be accounted for in the analysis.

5.2.5. Siting a New Receptor⁴

If a project is likely to be a place where people live, play, or convalesce, it should be considered a receptor. It should also be considered a receptor if sensitive individuals are likely to spend a significant amount of time there. Sensitive individuals refer to those segments of the population most susceptible to poor air quality: children, the elderly, and those with pre-existing serious health problems affected by air quality (ARB 2005). Examples of receptors include residences, schools and school yards, parks and play grounds, daycare centers, nursing homes, and medical facilities. Residences can include houses, apartments, and senior living complexes. Medical facilities can include hospitals, convalescent homes, and health clinics. Playgrounds could be play areas associated with parks or community centers.

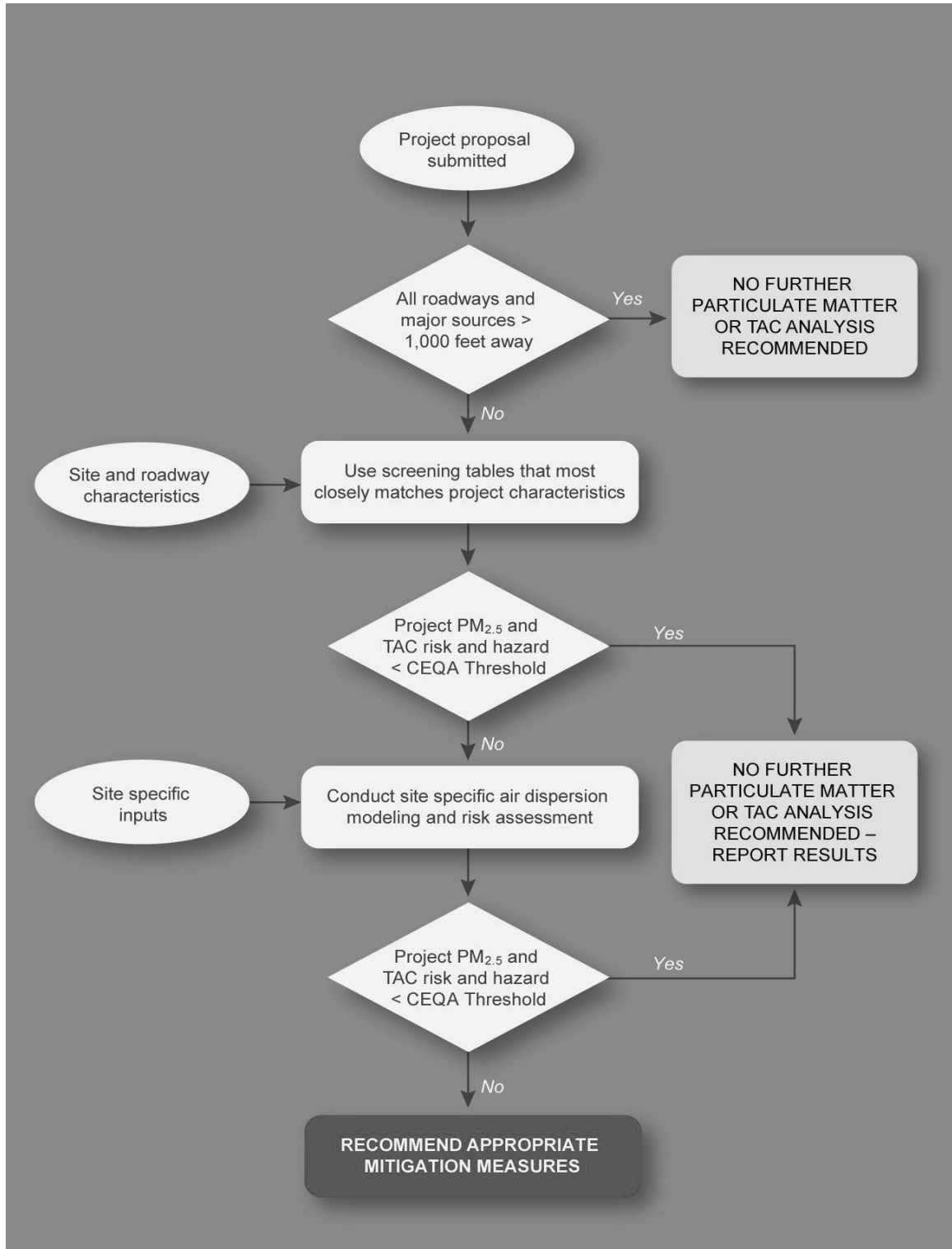
When siting a new receptor, a Lead Agency shall examine existing or future proposed sources of TAC and/or PM_{2.5} emissions that would adversely affect individuals within the planned project. A Lead Agency shall examine:

- the extent to which existing sources would increase risk levels, hazard index, and/or PM_{2.5} concentrations near the planned receptor,
- whether the existing sources are permitted or non-permitted by the BAAQMD, and
- whether there are freeways or major roadways near the planned receptor.

BAAQMD recommends that a Lead Agency identify all TAC and PM_{2.5} sources located within a 1,000 foot radius of the proposed project site. A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius. Permitted sources of TAC and PM_{2.5} should be identified and located as should freeways and major roadways, and other potential sources. To conduct a thorough search, a Lead Agency shall gather all facility data within 1,000 feet of the project site (and beyond where appropriate).

The phased approach for evaluating impacts to new receptors is shown in Figure 5-3.

⁴ The use of the receptor thresholds is discussed in section 2.8 of these Guidelines



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**Phased Approach for Estimating Community Risks and Hazards – Receptors
Figure 5-3**



5.2.6. Screening Table for Stationary Sources

BAAQMD will make available data for certain existing permitted, stationary sources of TAC and PM_{2.5} with site locations, coordinates, source type, and screening-level estimates of excess cancer risk, chronic, and acute HI, and PM_{2.5} concentrations. An example of the entries to be provided in this table is shown in Table 5-1.

<p align="center">Table 5-1 Screening Table for Existing Permitted Stationary Sources* (within 1,000 feet of the Proposed Project)</p>									
<p align="center">EXAMPLE Proposed Project Location Details: Address-19th Avenue and Judah Street, San Francisco, CA Centroid UTM's-E 546090, N 4179460</p>									
Site #	Facility Name	Street Address	City	UTM E	UTM N	Cancer Risk in a million	Chronic Hazard Index	Acute Hazard Index	PM _{2.5} ug/m ³
462	20th Avenue Cleaner	1845 Irving Street	San Francisco	546113	4179490	7.5	0.02	0.00	
4672	Sundown Cleaners	1952 Irving Street	San Francisco	546016	4179510	7.5	0.02	0.00	
13519	Pacific Bell	1515 19th Avenue	San Francisco	546086	4179240	58.4	0.10	0.04	0.10
2155	Chevron Station #91000	1288 19th Avenue	San Francisco	546052	4179720	5.8	0.03	0.00	
8756	ConocoPhillips #251075	1400 19th Avenue	San Francisco	546064	4179490	2.7	0.01	0.00	
9266	ConocoPhillips #2611185	1401 19th Avenue	San Francisco	546058	4179500	2.2	0.01	0.00	
Cumulative:						84	0.19	0.04	0.10
Source: BAAQMD 2009									
*This example provides conservative screening level estimates and does not represent actual risk levels, HI or PM concentrations for the facilities listed.									

Table 5-1 selects a hypothetical location at 19th Avenue and Judah Street in San Francisco, as shown at the top of the table along with the Universal Transverse Mercator (UTM) coordinates of the location. Below this location are listed permitted facilities within 1,000 feet of the example location. Each row contains entries for a specific existing permitted source and conservative estimates of maximum risk, hazard index, and PM_{2.5} concentration within the 1,000 foot radius. Within a row, each risk, HI, or PM_{2.5} concentration for a source can be compared to the significance threshold: cancer risk is compared to 10 in a million; chronic and acute hazard index are compared to 1.0; and PM_{2.5} concentration is compared to 0.3 µg/m³. In Table 5-1 all entries are below the target threshold except for the source at 1515 19th Avenue, which has a cancer risk, conservatively estimated at about 58 in a million.

It is important to note that the listing of existing sources provided by the BAAQMD provides conservative screening-level estimates and does not represent the actual risk levels, HI, or PM



concentrations for that facility. These estimates are assumed to be uniform within the 1,000 foot radius and independent of the distance between source and receptor.

To use the screening tables, a Lead Agency would identify sources in the tables within 1,000 feet (or beyond where appropriate) of the project site. Risks, hazards, and PM_{2.5} concentrations for individual sources correspond to the table entries. These values are assumed to remain constant for all locations within the 1,000 foot radius. Table entries within a column can be summed to estimate the cumulative risks from all sources. The screening table for Air District permitted sources is also available as a compressed keyhole language (kmz) file for each of the nine Bay Area counties. The kmz file can be plotted using the Google Earth™ mapping tool, which is freely available as described in [Recommended Methodology for Screening and Modeling Local Risks and Hazards](#).

5.2.7. Screening Tables for On-road Mobile Sources

For all State highways within the SFBAAB, BAAQMD will make available a set of maps and tables that provide screening-level risks and PM_{2.5} concentrations. Screening tables are provided for each of the nine counties within BAAQMD's jurisdiction. To develop these tables, BAAQMD selected conservative assumptions and inputs following this general methodology:

- Hourly vehicle miles traveled (VMT) and emissions for 2012 were developed for each county using EMFAC based on default vehicle mix and full range of vehicle speeds.
- Highest vehicle traffic volumes for each roadway based on Caltrans's *2007 Traffic Volumes on California State Highways* were scaled based on VMT to develop hourly vehicle volumes.
- Hourly vehicle volume and emissions were input into a roadway model, CAL3QHCR, to estimate annual average concentrations using the most conservative meteorological data collected from monitoring locations within each county.

For the PM_{2.5} screening tables, the peak one hour of traffic was used to develop hourly vehicle volumes that totaled to the annual average daily traffic while risk and hazard tables are based on annual average daily vehicle volumes.

The purpose of the screening tables is to provide an easy-to-use initial analysis to determine if nearby roadway impacts to a new receptor are below the thresholds of significance. The outcome of the screening may be used to make a determination of no further action or it may indicate that a more refined analysis is warranted. The recommended project screening approach is as follows:

1. Determine if the new receptor is at least 1,000 feet from the nearest significant traffic volume roadway defined as a freeway or arterial roadway with greater than 10,000 vehicles per day. For new residential developments, the receptor should be placed at the edge of the property boundary. If the receptor does not have any significant roadway sources within 1,000 foot radius, then the proposed project meets the distance requirements and no further single-source roadway-related air quality evaluation is recommended.
2. If the receptor is within the 1,000 feet radius of a nearby roadway that has greater than 20,000 vehicles per day, then use the county- and road-specific screening tables to determine the PM_{2.5} concentrations, cancer risks, and hazards for the project. For non-California highways, default local roadway screening tables are provided in the online report [Recommended Methodology for Screening and Modeling Local Risks and Hazards](#). If any of the thresholds for PM_{2.5} concentration, risks, and hazards are



exceeded based on the comparisons, then more refined modeling analysis is recommended or the project sponsor may choose to implement mitigation measures.

3. For developments that exceed the screening analysis, site specific modeling analysis is recommended following BAAQMD's *Recommended Methodology for Screening and Modeling Local Risks and Hazards*.

For completion of Step 2 as described above, the methodology requires the use of appropriate screening tables to determine if the distance from the development to the nearby significant roadway will expose new receptors to concentrations exceeding the thresholds. The first step is to ensure that the latest screening tables have been downloaded from BAAQMD's website. An example (Table 5-2) is included in this section for San Francisco County for demonstration purposes only and should not be relied upon for use in a CEQA analysis. The Lead Agency or project sponsor must first gather project information including the county for which the development is proposed and the distance of the project to the nearest state highway or local roadway to determine which screening tables are appropriate. For each county, two tables are provided for PM_{2.5} concentrations, cancer risks, chronic non-cancer hazards, and acute non-cancer hazards based on whether the project is located north or south of the roadway or east or west of the roadway. The direction tables correspond to whether the projects are located generally upwind or downwind of the roadway with respect to the prevailing wind direction. Appropriate values are then posted in each table based on the project being located 100 feet, 200 feet, 500 feet, 700 feet, and 1,000 feet from the edge of the nearest travel lane to the project.

For proposed projects, the appropriate cell should be determined by referencing the corresponding county, roadway, and project distance in the tables that most closely matches the project conditions. If the project is predominantly north or south of the roadway, choose the north or south tables. Likewise, if the project is predominantly east or west, choose the east or west tables. If the project is evenly located for example, northeast or southwest of the roadway, select the higher value between either screening tables based on the project distance to the roadway. For distances not listed in the tables, BAAQMD recommends that the values between the two closest distances be linearly interpolated to estimate the value that best reflects the actual project distance.

The results of the screening analysis indicate whether new receptors will be exposed to roadway TAC emissions at concentrations exceeding the threshold of significance and therefore, a more refined modeling analysis and quantitative HRA may be required. If the concentration is less than the thresholds, then no further analysis is required for the single source comparison for roadways. The results of the analysis should be reported in the environmental documentation or staff report that includes a reference to the screening tables used. If the concentrations exceed the thresholds, then the project sponsor has the option to conduct a more refined modeling analysis or implement appropriate mitigation measures.

An example of how to use the screening tables is provided as follows. A new residential development is hypothetically proposed at the intersection of 23rd Street and Minnesota Street in San Francisco. It is located approximately 440 feet to the east of midpoint of northbound Highway 280. Based on Table 5-2, the PM_{2.5} concentrations from Highway 280 is 0.60 µg/m³ at 200 feet away and 0.28 µg/m³ 500 feet away from the project.



**Table 5-2
East or West of San Francisco County Highway**

Highway	Distance East or West of Freeway – PM _{2.5} Concentrations (ug/m ³)				
	100 Feet	200 Feet	500 Feet	700 Feet	1,000 Feet
1	0.50	0.28	0.12	0.096	0.060
35	0.14	0.11	0.032	0.020	0.016
80	1.0	0.64	0.30	0.20	0.15
101	1.1	0.72	0.34	0.26	0.17
280	0.80	0.60	0.28	0.19	0.13

Source: BAAQMD 2009; table above for demonstration purposes and should not be used in CEQA analysis.

To linearly interpolate the PM_{2.5} concentration for the project distance of 440 feet, the following equation was used:

$$(200 \text{ ft} - 500 \text{ ft}) \times (0.60 \text{ ug/m}^3 - \text{PM}_{2.5 \text{ 440 feet}}) = (200 \text{ ft} - 440 \text{ ft}) \times (0.6 \text{ ug/m}^3 - 0.28 \text{ ug/m}^3)$$

Solving for PM_{2.5} at 440 feet, the PM_{2.5} concentration is estimated as 0.34 ug/m³.

A similar example methodology was applied to the cancer risk, chronic non-cancer hazard and acute hazard. The resulting values based on a distance of 440 feet are shown in Table 5-3.

**Table 5-3
Cancer and Non-Cancer (Chronic and Acute) Hazard Indices at 440 feet**

Description	Screening Value	Thresholds	Exceeds Threshold?
PM _{2.5} Concentration	0.34 ug/m ³	0.3 ug/m ³	Yes
Cancer Risk	1.1 in a million	10 in a million	No
Chronic Non-cancer Hazard Index	0.028	1	No
Acute Non-cancer Hazard Index	0.028	1	No

Source: BAAQMD 2009; table above for demonstration purposes and should not be used in CEQA analysis.

In this example, the proposed project would exceed the PM_{2.5} threshold, but not the risk or hazard-based thresholds. At this point, the project sponsor can ratio the PM concentration further based on the actual AADT at the closest milepost to the project. If the concentrations continue to exceed the threshold, the project sponsor can determine whether additional modeling is warranted or implementation of mitigation measures is appropriate. Possible options include moving the residential portion of the development to a distance at which the roadway impacts would be negligible or installing high efficiency filtration in the development.



If the project sponsors choose to conduct a more refined modeling analysis, BAAQMD recommends the following general procedures. More detailed methodology is provided on the online resources located at BAAQMD’s CEQA webpage. To evaluate PM_{2.5} concentrations, BAAQMD recommends using CAL3QHC, which was designed to model roadside CO and PM concentrations. The CAL3QHCR model can estimate PM_{2.5} concentrations at defined receptor locations by processing hourly meteorological data over a year, hourly emissions, and traffic volume. The latest version of the model is available at: http://www.epa.gov/scram001/dispersion_prefrec.htm.

To run CAL3QHCR, meteorological, traffic, and vehicle emissions data at specified intervals over time are required. BAAQMD recommends the use of the meteorological data that most closely representatives conditions at the site. BAAQMD offers readily compatible meteorological data for each county within the SFBAAB that can be run by CAL3QHCR at <http://hank.baaqmd.gov/tec/data/>. For the screening analysis, BAAQMD relied on the most conservative meteorological data collected from any stations within the county; however, in this site-specific analysis, the user should select the data that is nearest the project and reflects actual meteorological conditions.

Emissions data must also be input into the CAL3QHCR model. Year 2012 average hourly emissions (e.g., grams/vehicle mile) were used in developing the screening tables. The emissions data can be produced using the EMFAC2007 model, but should be reflective of the base year in which residents will be residing in the new development. The model should also be run assuming the full range of vehicle fleet and if available, the average vehicle speeds along the specific stretch of road. However, if average speeds are not available, the user should select the full range of variable speeds to ensure that the analysis is health protective.

Highway Number	Average Daily 2-way Traffic Volumes (Vehicles/day)	Start Location	End Location
1	122,000	Alemany Boulevard	Presidio, South Highway 2, onto Golden Gate Bridge
35	31,000	John Muir Drive	Highway 1, Sloat Boulevard at 19 th Avenue
80	254,000	Highway 101 at Division Street	Bay Bridge at Treasure Island, Yerba Buena Island
101	245,000	Third Street	Van Ness Avenue to Highway 1 at Golden Gate Bridge
280	195,000	Alemany Boulevard, San Jose Avenue	Mariposa Street to 4 th Street and Brannan Street

Source: BAAQMD 2009

How to use the screening tables:

- Distance is from the center of the highway to the facility or development
- When two or more highways are within the influence area, sum the contribution from each freeway



The CAL3QHCR model also relies on hourly traffic volumes (e.g., vehicles per hour) as determined by the relative VMT. BAAQMD recommends developing a weighed VMT by using the ratio of VMT per hour to the peak VMT over the 24 hour day (as produced by the EMFAC model). This weighed VMT represents the percentage of traffic volume on an hourly basis over a 24 hour period. The hourly traffic volumes for the CAL3QHCR model are then the product of the weighed VMT by the peak traffic volumes for that roadway. The peak one-hour vehicle traffic for the applicable milepost of any California highway can be determined through the Caltrans web site at <http://traffic-counts.dot.ca.gov/>. Develop hourly emissions rates for input into the air model. The model provides annual average PM_{2.5} concentrations that can be compared directly against the thresholds.

A more detailed analysis is required for estimating the risk and hazard evaluation. TAC emissions were evaluated for only those toxic compounds found in diesel or gasoline fuel including diesel PM, benzene, ethylbenzene, acrolein, etc. The District recommends using the CAL3QHCR model. The model must be run separately to estimate emissions from diesel PM and emission of other TAC. In each analysis, the District recommends developing diesel specific emission factors from EMFAC. Because risk and hazard are expressed as lifetime exposure, the emissions were averaged from 2012 to 2040 that accounts for more efficient vehicle emissions and increased VMT. Beyond 2040, the EMFAC model does not have emissions and consequently, the 2040 emissions were applied from 2040 to 2082, to complete a 70-year lifetime exposure.

Annual average traffic volumes were used in the model. As specified in Regulation 2, Rule 5, BAAQMD recommends that age sensitivity factors be applied to the emissions per year to account for early life-stage exposures. The cancer risk and hazard levels are calculated using the predicted annual average concentrations multiplied by the cancer slope factor for cancer risk or divided by the relative exposure levels for hazard.

The risk and hazard levels are then compared against the applicable thresholds. Further assessment may be warranted if the thresholds are exceeded, but the project sponsor may consider design changes and other mitigation measures as a means of reducing potential risks (see Section 5.4). For detailed discussion on this methodology, the project sponsor should download the online report [*Recommended Methodology for Screening and Modeling Local Risks and Hazards*](#).

5.3. CUMULATIVE IMPACTS

5.3.1. Significance Determination

A Lead Agency shall examine TAC and/or PM_{2.5} sources that are located within 1,000 feet of a proposed project site. Sources of TACs include, but are not limited to, land uses such as freeways and high volume roadways, truck distribution centers, ports, rail yards, refineries, chrome plating facilities, dry cleaners using perchloroethylene, and gasoline dispensing facilities. Land uses that contain permitted sources, such as a landfill or manufacturing plant, may also contain non-permitted TAC and/or PM_{2.5} sources, particularly if they host a high volume of diesel truck activity. A Lead Agency should determine what the combined risk levels are from all nearby TAC sources in the vicinity of sensitive receptors. Lead agencies should use their judgment to decide if there are significant sources outside 1,000 feet that should be included.

A Lead Agency's analysis shall determine whether TAC and/or PM_{2.5} emissions generated as part of a proposed project would expose off-site receptors to risk levels that exceed BAAQMD's applicable *Thresholds of Significance* for determining cumulative impacts.



A project would have a cumulative significant impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000 foot radius (or beyond where appropriate) from the fence line of a source, or from the location of a receptor, plus the contribution from the project, exceeds the following:

- An excess cancer risk levels of more than 100 in one million or a chronic hazard index greater than 10 for TACs; or
- 0.8 $\mu\text{g}/\text{m}^3$ annual average $\text{PM}_{2.5}$.

Within impacted communities identified under BAAQMD's CARE program, the Lead Agency is encouraged to develop and adopt a Community Risk Reduction Plan. To determine whether a new source is located in an impacted community, the Lead Agency should refer to Figure 5-1 and the [CARE webpage](#). Please consult with BAAQMD if a more precise map is needed.

BAAQMD recommends that cumulative impacts of new sources and new receptors be evaluated as described in Section 5.2, and include the impacts of all individual sources (stationary and roadways) within the 1,000 foot radius.

Community risk and hazards analyses should follow guidance developed by BAAQMD for risk screening described in *Recommended Methodology for Screening and Modeling Local Risks and Hazards*, which generally follows CAPCOA's guidance document titled *Health Risk Assessments for Proposed Land Use Projects*. $\text{PM}_{2.5}$ concentrations and risk levels estimated for the locations where receptors may be located should be compared to BAAQMD's applicable *Threshold of Significance* for siting a new receptor near existing sources of TAC emissions.

A Lead Agency shall compare the analysis results from TAC and $\text{PM}_{2.5}$ emissions with the applicable *Threshold of Significance*. *Thresholds of Significance* apply for projects that would site new permitted or non-permitted sources in close proximity to receptors and for projects that would site new sensitive receptors in close proximity to permitted or non-permitted sources of TAC emissions. If a proposed project would not exceed BAAQMD's applicable *Threshold of Significance* for TACs or $\text{PM}_{2.5}$, then the project would result in a less-than-significant air quality impact. If a project would exceed the applicable *Threshold of Significance*, the proposed project would result in a significant air quality impact and the Lead Agency should implement all feasible mitigation to reduce the impact (refer to Section 5.4).

If implementation of BAAQMD-recommended mitigation measures for reducing TAC and $\text{PM}_{2.5}$ emissions and resultant exposure to health risks would reduce all TAC impacts to levels below the applicable *Threshold of Significance*, TAC impacts would be reduced to a less-than-significant level. If resultant health risk exposure would still exceed the applicable *Threshold of Significance*, the impacts would remain significant and unavoidable.

5.4. COMMUNITY RISK REDUCTION PLANS

The goal of a Community Risk Reduction Plan would be to bring TAC and $\text{PM}_{2.5}$ concentrations for the entire community covered by the Plan down to acceptable levels as identified by the local jurisdiction and approved by the Air District. This approach provides local agencies a proactive alternative to addressing communities with high levels of risk on a project-by-project approach. The Air District has developed detailed guidelines for preparing Community Risk Reduction Plans which can be found on the Air District web site at: <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx>.



Qualified Community Risk Reduction Plans

A qualified Community Risk Reduction Plan adopted by a local jurisdiction should include, at a minimum, the following elements:

- (A) Define a planning area;
- (B) Include base year and future year emissions inventories of TACs and PM_{2.5};
- (C) Include Air District–approved risk modeling of current and future risks;
- (D) Establish risk and exposure reduction goals and targets for the community in consultation with Air District staff;
- (E) Identify feasible, quantifiable, and verifiable measures to reduce emissions and exposures;
- (F) Include procedures for monitoring and updating the inventory, modeling and reduction measures in coordination with Air District staff;
- (G) Be adopted in a public process following environmental review.

5.5. MITIGATING LOCAL COMMUNITY RISK AND HAZARD IMPACTS

For stationary sources, please refer to [BAAQMD’s permit handbook and BACT/T-BACT workbook](#). BAAQMD-recommended mitigation measures for reducing the exposure of sensitive receptors to TACs and hazards include the following:

1. Increase project distance from freeways and/or major roadways.
2. Redesign the site layout to locate sensitive receptors as far as possible from any freeways, major roadways, or other non-permitted TAC sources (e.g., loading docks, parking lots).
3. In some cases, BAAQMD may recommend site redesign. BAAQMD will work closely with the local jurisdiction and project consultant in developing a design that is more appropriate for the site.
4. Large projects may consider phased development where commercial/retail portions of the project are developed first. This would allow time for CARB’s diesel regulations to effectively reduce diesel emissions along major highways and arterial roadways. Ultimately lower concentrations would be predicted along the roads in the near future such that residential development would be impacted by less risk in later phases of development.
5. Projects that propose sensitive receptors adjacent to sources of diesel PM (e.g., freeways, major roadways, rail lines, and rail yards) shall consider tiered plantings of trees such as redwood, deodar cedar, live oak and oleander to reduce TAC and PM exposure. This recommendation is based on a laboratory study that measured the removal rates of PM passing through leaves and needles of vegetation. Particles were generated in a wind tunnel and a static chamber and passed through vegetative layers at low wind velocities. Redwood, deodar cedar, live oak, and oleander were tested. The results indicate that all forms of vegetation were able to remove 65–85 percent of very fine particles at wind velocities below 1.5 meters per second (approximately 3 miles per hour [mph]) with redwood and deodar cedar being the most effective. Even greater



removal rates were predicted for ultra-fine PM (i.e., aerodynamic resistance diameter of 0.1 micrometer or less).

6. Install and maintain air filtration systems of fresh air supply either on an individual unit-by-unit basis, with individual air intake and exhaust ducts ventilating each unit separately, or through a centralized building ventilation system. The ventilation system should be certified to achieve a certain effectiveness, for example, to remove at least 80% of ambient PM_{2.5} concentrations from indoor areas. The air intake for these units should be located away from areas producing the air pollution (i.e., away from major roadways and highways).
7. Where appropriate, install passive (drop-in) electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph).
8. Locate air intakes and design windows to reduce PM exposure (e.g., windows nearest to the freeway do not open).
9. Install indoor air quality monitoring units in buildings.
10. Require rerouting of nearby heavy-duty truck routes.
11. Enforce illegal parking and/or idling of heavy-duty trucks in vicinity.



6. LOCAL CARBON MONOXIDE IMPACTS



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Emissions and ambient concentrations of CO have decreased dramatically in the SFBAAB with the introduction of the catalytic converter in 1975. No exceedances of the CAAQS or NAAQS for CO have been recorded at nearby monitoring stations since 1991. SFBAAB is currently designated as an attainment area for the CAAQS and NAAQS for CO; however, elevated localized concentrations of CO still warrant consideration in the environmental review process. Occurrences of localized CO concentrations, known

as hotspots, are often associated with heavy traffic congestion, which most frequently occur at signalized intersections of high-volume roadways.

6.1. SIGNIFICANCE DETERMINATION

Step 1: Comparison of Project Attributes with Screening Criteria

The first step in determining the significance of CO emissions is to compare the attributes of the proposed project to the applicable *Screening Criteria* (refer to Chapter 3).

This preliminary screening procedure provides a conservative indication of whether the proposed project would result in the generation of CO concentrations that would substantially contribute to an exceedance of the *Thresholds of Significance*. If all of the *Screening Criteria* are met, the proposed project would result in a less-than-significant impact to air quality with respect to concentrations of local CO. If the proposed project does not meet all the screening criteria, then CO emissions should be quantified.

Step 2: Emissions Quantification

This section describes recommended methodologies for quantifying concentrations of local CO for proposed projects that do not meet all of the *Screening Criteria*. The recommended methodology is to use both the On-Road Mobile-Source Emission Factors (EMFAC) and the California Line Source Dispersion Model (CALINE4) models in accordance with recommendations in the University of California, Davis, Transportation Project-Level Carbon Monoxide Protocol (*CO Protocol*) (Garza, et al. 1997).

Air Quality Models

BAAQMD recommends using the most current version of the EMFAC model to obtain mobile-source emission factors for CO associated with operating conditions that would be representative of the roadway or facility subject to analysis.

Users should input the emission factors and other input parameters into the CALINE4 model to quantify CO concentrations near roadways or facilities.

The CO Protocol contains detailed methodology for modeling CO impacts.



Input Parameters

The CALINE4 model contains five screens for input data. CALINE4 input parameters are summarized below. For more detailed descriptions see the [CALINE4 Users Guide](#).

Job Parameters

File Name – Name the file (e.g., data file extension) to create the CALINE4 Input file.

Job Title – Provide a name for the modeling scenario (e.g., existing no project, existing plus project).

Run Type – Select the worst-case wind angle.

Aerodynamic Roughness Coefficient – Choose the characteristic (i.e., rural, suburban, central business district, other) that is most representative of the project site.

Model Information – Indicate the unit of measurement (i.e., meters or feet) and inputs the vertical dimension of the project (i.e., altitude above sea level).

Run – Once data input is completed, return to this screen to run the model. Upon running the model, the output will appear as a text file called C4\$.out. Save the output file under an appropriate filename for future reference.

Link Geometry

On this screen, input the dimensions (i.e., coordinates) for the roadway intersection that is the subject of the analysis.

Link Name – Input names for each roadway segment.

Link Type – Indicate the character of the roadway segment (i.e., at-grade, depressed, fill, bridge, parking lot).

Endpoint Coordinates (X₁, X₂, Y₁, Y₂) – Input the dimensions (i.e., coordinates) of the roadway segments as though the intersection were oriented at point of origin X = 0, Y = 0 on a Cartesian coordinate system. Roadway segments approaching the intersection from the west side of the screen (if north is treated as “up”, or the top of the screen) would have negative X coordinate endpoints. Similarly, roadway segments approaching the intersection from the south would have negative Y coordinate endpoints.

Link Height – Indicate the vertical dimension of the roadway segment. If the roadway segment is at-grade, should set this parameter to zero. If the roadway segment is depressed, enter a negative value for this parameter.

Mixing Zone Width – The Mixing Zone is defined as the width of the roadway, plus three meters on either side. The minimum allowable value is 10 meters, or 32.81 feet.

Canyon/Bluff (Mix Left/Right) – Set these features to zero.

Link Activity

Traffic Volume – Input hourly traffic volumes applicable to each roadway segment.

Emission Factor – Input the CO emission factor (in units of grams/mile) obtained from EMFAC for the applicable vehicle speed class reflecting operating conditions for the affected intersection.

Run Conditions

Wind Speed – Input 0.5 meters per second to represent worst-case conditions.



Wind Direction – Set parameter to zero. Select “Worst-Case Wind Angle” as the “Run Type” on the “Job Parameters” screen, so this field will be overridden by the model.

Wind Direction Standard Deviation – Use a wind direction standard deviation of 5 degrees to represent worst-case conditions.

Atmospheric Stability Class – Use Stability Class 4 (i.e., class D) to represent average conditions in the SFBAAB.

Mixing Height – Indicate the vertical dimension over which vertical mixing may occur. In most situations, input 300 meters, approximately the height of the atmospheric boundary layer. If the roadway subject to analysis is a bridge underpass, tunnel, or other situation where vertical mixing would be limited, indicates the height of the structure that would hamper vertical mixing (in units of meters).

Ambient Temperature – Indicate the average temperature of the project site during the time of day at which maximum daily traffic volume would occur (in degrees Celsius). A temperature of 7.2 degrees Celsius is recommended.

Ambient Pollutant Concentration – Enter 0 in this field to determine the contribution of CO from the roadway subject to analysis. Add the roadway-related CO concentration to ambient CO levels outside of the CALINE4 model, as discussed later in this section.

Receptor Positions

Receptor Name – Input names for each receptor.

Receptor Coordinates (X, Y, Z) – Input receptor coordinates in a manner similar to the “Link Coordinates” on the “Link Geometry” screen. Locate receptors at three and seven meters from the intersection in all directions from the intersection, in accordance with the recommendations of the *CO Protocol*. The Receptor Coordinates are oriented in the same Cartesian coordinate system as the roadway segment “Link Coordinates.” Receptors located to the southwest of the intersection would have negative X and Y coordinates. The Z dimension should be assigned the coordinate of 1.8 meters (5.9 feet); the approximate breathing height of a receptor located adjacent to the roadway.

This screen also contains a window that shows a map of the link and receptor coordinates in the X, Y plane.

Model Output

CALINE4 output includes estimated 1-hour CO concentrations in units of ppm at the receptor locations input into the model. Note the highest concentrations at each of the three meter and seven meter receptor distances from the roadway.

Background Concentrations

Ambient 1-hour CO concentrations can be obtained from [ARB air quality monitoring station data](#) and 8-hour concentrations from [EPA](#). Users should obtain the CO monitoring data recorded at the monitoring station nearest the project site. According to the *CO Protocol*, select the second highest concentration recorded during the last two years to represent the ambient CO concentration in the project area.

Estimated Localized CO Concentrations

Users should sum the highest modeled 1-hour CO concentration in units of ppm obtained from CALINE4 to ambient (background) 1-hour CO concentrations in ppm obtained from ARB. This represents the modeled worst-case 1-hour CO concentration near the affected roadway.



Persistence Factor – multiply the highest 1-hour CO concentration estimated by CALINE4 by a persistence factor of 0.7, as recommended in the CO Protocol, to obtain the estimated 8-hour CO concentration.

Add the estimated 8-hour CO concentration (ppm) obtained in the previous step to the ambient 8-hour CO concentration obtained from EPA (ppm). This represents the modeled worst-case 8-hour CO concentration near the affected roadway.

Step 3: Comparison of Unmitigated Emissions with Thresholds of Significance

Following quantification of local CO emissions in accordance with the recommended methods, compare the total modeled worst-case 1-hour and 8-hour CO concentrations with the applicable *Threshold of Significance*. If the modeled concentrations do not exceed any of the *Thresholds of Significance*, the project would result in a less-than-significant impact to air quality. If modeled concentrations do exceed any applicable *Threshold of Significance*, the proposed project would result in a significant impact to air quality with respect to local CO impacts.

Step 4: Mitigation Measures and Emission Reductions

Where local CO emissions exceed applicable *Thresholds of Significance*, refer to Section 6.2 for recommended mitigation measures and associated emission reductions. Only reduction measures included in the proposed project or recommended as mitigation in a CEQA-compliant document can be included when quantifying mitigated emission levels.

Step 5: Comparison of Mitigated Emissions with Thresholds of Significance

Following quantification of local CO emissions in accordance with the recommended methods, compare the total modeled worst-case 1-hour and 8-hour CO concentrations with the applicable *Thresholds of Significance*. If the implementation of recommended mitigation measures reduces all local CO emissions to levels below the applicable *Thresholds of Significance*, the impact to air quality would be reduced to a less-than-significant level. If mitigated levels of local CO emissions still exceed the applicable *Threshold of Significance*, the impact to air quality would remain significant and unavoidable.

6.2. MITIGATING LOCAL CARBON MONOXIDE IMPACTS

The following section describes recommended mitigation measures for reducing local CO impacts to air quality. Consider implementation of the following measures, as feasible, for reducing project-generated traffic volumes and associated CO emissions at affected intersections. Actual emission reductions should be quantified through project-specific transportation modeling.

1. Synchronize traffic signals to improve traffic flow and minimize traffic congestion.
2. Consider additional traffic signals, such as light metering, to relocate congested areas further away from receptors.
3. Improve public transit service to reduce vehicle traffic and increase public transit mode share during peak traffic congestion periods.
4. Improve bicycle and pedestrian infrastructure to reduce vehicle traffic and increase bicycle and pedestrian mode share during peak traffic congestion periods. Improvements may include installing class I or II bike lanes, sidewalks, and traffic calming features.
5. Adjust pedestrian crosswalk signal timing to minimize waiting time for vehicles turning right or otherwise sharing green time with pedestrians. Give pedestrians a head start before traffic signal changes to green.



6. Where pedestrian traffic is high, implement pedestrian crosswalks with multi-directional crossings allowing pedestrians to cross intersections diagonally.
7. Limit heavy-duty truck traffic during peak hours. Designate truck routes that divert truck traffic away from congested intersections.
8. Limit left turns or other maneuvers during peak hours that add to congestion.
9. Limit on-street parking during peak hours to allow for added vehicle capacity.
10. Implement traffic congestion-alleviating mitigation measures as identified by a traffic engineer.

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7. ODOR IMPACTS⁵

Odor impacts could result from siting a new odor source near existing sensitive receptors or siting a new sensitive receptor near an existing odor source. Examples of land uses that have the potential to generate considerable odors include, but are not limited to:

1. Wastewater treatment plants;
2. Landfills;
3. Confined animal facilities;
4. Composting stations;
5. Food manufacturing plants;
6. Refineries; and
7. Chemical plants.

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word strong to describe the intensity of an odor. Odor intensity depends on the concentration in the air. When an odor sample is progressively diluted, the odor concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odor reaches a level that is no longer detectable.

The presence of an odor impact is dependent on a number of variables including:

1. Nature of the odor source (e.g., wastewater treatment plant, food processing plant);
2. Frequency of odor generation (e.g., daily, seasonal, activity-specific);
3. Intensity of odor (e.g., concentration);
4. Distance of odor source to sensitive receptors (e.g., miles);
5. Wind direction (e.g., upwind or downwind); and
6. Sensitivity of the receptor.

The recommendations provided in this chapter only apply to assessing and mitigating odor impacts for individual projects. Please refer to Chapter 9 for recommendations for assessing and mitigating odor impacts at the plan-level.

⁵ The use of the receptor thresholds is discussed in section 2.8 of these Guidelines



7.1. SIGNIFICANCE DETERMINATION

Odor impacts could occur from two different situations:

1. Siting a new odor source (e.g., the project includes a proposed odor source near existing sensitive receptors), or
2. Siting a new receptor (e.g., the project includes proposed sensitive receptors near an existing odor source).

Regardless of the situation, BAAQMD recommends completing the following steps to comprehensively analyze the potential for an odor impact.

Step 1: Disclosure of Odor Parameters

The first step in assessing potential odor impacts is to gather and disclose applicable information regarding the characteristics of the buffer zone between the sensitive receptor(s) and the odor source(s), local meteorological conditions, and the nature of the odor source. Consideration of such parameters assists in evaluating the potential for odor impacts as a result of the proposed project. Projects should clearly state the following information in odor analyses, which provide the minimum amount of information required to address potential odor impacts:

1. Type of odor source(s) the project is exposed to or the type of odor source(s) produced by the project (e.g., wastewater treatment plant, landfill, food manufacturing plant);
2. Frequency of odor events generated by odor source(s) (e.g., operating hours, seasonal);
3. Distance and landscape between the odor source(s) and the sensitive receptor(s) (e.g., topography, land features); and
4. Predominant wind direction and speed and whether the sensitive receptor(s) in question are upwind or downwind from the odor source(s).

Step 2: Odor Screening Distances

BAAQMD has developed a list of recommended odor screening distances for specific odor-generating facilities shown in Table 3-3. Projects that would locate sensitive receptor(s) to odor source(s) closer than the screening distances would be considered to result in a potential significant impact. If the proposed project would include the operation of an odor source, the screening distances should also be used to evaluate the potential impact to existing sensitive receptors. Projects that would locate sensitive receptor(s) near odor source(s) farther than the screening distances, or vice versa, would be considered to have a sufficient buffer to avoid significant impacts. The odor screening distances in Table 3-3 should not be used as absolute thresholds, rather an indicator to how much further analysis is required. The Lead Agency should also consider the other parameters listed above in Step 1 and information from Step 3 below to comprehensively evaluate potential odor impacts.

Step 3: Odor Complaint History

The impact of an existing odor source on surrounding sensitive receptors should also be evaluated by identifying the number of confirmed complaints received for that specific odor source.

Facilities that are regulated by CalRecycle (e.g. landfill, composting, etc.) are required to have Odor Impact Minimization Plans (OIMP) in place and have procedures that establish fence line odor detection thresholds. The Air District recognizes a Lead Agency's discretion under CEQA to use established odor detection thresholds as thresholds of significance for CEQA review for CalRecycle regulated facilities with an adopted OIMP.



If the proposed project would be located near an existing odor source, lead agencies should contact BAAQMD to obtain the odor complaints over the past 3 years for the source in question. Then calculate the annual average confirmed odor complaints filed for the source. BAAQMD considers a source to have a substantial number of odor complaints if the complaint history includes five or more confirmed complaints per year averaged over a 3-year period. Also, disclose the distance at which receptors were affected by the existing odor source. As discussed in Step 1, describe the topography and landscape between the receptors and the odor source. These distances and landscaping should then be compared with the distance and landscape that would separate the proposed project and the odor source.

If the proposed project would locate an odor source, first identify the location of potential sensitive receptors (i.e., distance, upwind/downwind) with respect to the project site. If the proposed odor source does not have any existing or planned sensitive receptors within the screening distances shown in Table 3-3, it may be considered less than significant for odor impacts. To evaluate how implementation of the proposed source project would affect identified sensitive receptors contact BAAQMD to obtain odor complaints in the region for facilities similar in size and type of odor produced in the past 3 years. These surrogate odor complaints should be evaluated for their distance from source to receptor, and then compared with the distance from the proposed project to receptors. Odor complaints from the surrogate odor source are considered substantial if the complaint history includes more than five confirmed complaints per year averaged over a 3-year period.

BAAQMD considers a substantial number of odor complaints, specifically, more than five confirmed complaints per year averaged over the past three years as the indication of an odor impact. As discussed above, the Lead Agency should compare the odor parameters (i.e., distance and wind direction) associated with the odor complaints that have been filed with those of the proposed project. Similar to the odor screening distances, odor complaints should not be used as an absolute threshold, but evidence to support a significance determination.

Step 4: Significance Determination

An odor source with five or more confirmed complaints per year averaged over three years is considered to have a significant impact. BAAQMD recognizes that there is not one piece of information that can solely be used to determine the significance of an odor impact. The factors (i.e., Step 1 through 3) discussed above could enhance the potential for a significant odor impact or help prevent the potential for a significant odor impact. For example, a project that would be located near an existing odor source may not discover any odor complaints for the existing odor source. It is possible that factors such as a small number of existing nearby receptors, predominate wind direction blowing away from the existing receptors, and/or seasonality of the odor source has prevented any odor complaints from being filed about the existing odor source. The results of each of the steps above should be clearly disclosed in the CEQA document. Projects should use the collective information from Steps 1 through 3 to qualitatively evaluate the potential for a significant odor impact. The Lead Agency should clearly state the reasoning for the significance determination using information from Steps 1 through 3 to support the determination.

7.2. MITIGATING ODOR IMPACTS

BAAQMD considers appropriate land use planning the primary method to mitigate odor impacts. Providing a sufficient buffer zone between sensitive receptors and odor sources should be considered prior to analyzing implementation of odor mitigation technology. Projects that would include potential sensitive receptors should consider the odor parameters, discussed in Step 1 above, during the planning process to avoid siting receptors near odor sources. Similarly, projects



that would include an odor source should consider the location of nearby existing sensitive receptors that could be affected by the project.

The source types for which mitigation has been provided below have been selected based on the nature of the odors produced as a result of their operational activities. These land use types are those most likely to result in odor impacts if sensitive receptors are located in close proximity. This should not be considered an exhaustive list and due to the subjective nature of odor impacts, there is no formulaic method to assess if odor mitigation is sufficient. In determining whether the implementation of mitigation would reduce the potential odor impact to a less-than-significant level, rely on the information obtained through the steps above.

7.2.1. Wastewater Treatment Plant

Main odor sources for wastewater treatment plants typically are the headworks area where the wastewater enters the facility and large solids and grit are removed, the primary clarifiers where suspended solids are removed, and the aeration basins when poor mixing characteristics lead to inadequate dissolved oxygen levels. Lead agencies should consider applying the following odor mitigation measures to wastewater treatment plants.

1. Activated Carbon Filter/Carbon adsorption
2. Biofiltration/Bio Trickling Filters
3. Fine Bubble Aerator
4. Hooded Enclosures
5. Wet and Dry Scrubbers
6. Caustic and Hypochlorite Chemical Scrubbers
7. Ammonia Scrubber
8. Energy Efficient Blower System
9. Thermal Oxidizer
10. Capping/Covering Storage Basins and Anaerobic Ponds
11. Mixed Flow Exhaust
12. Wastewater circulation technology
13. Exhaust stack and vent location with respect to receptors

7.2.2. Landfill/Recycling/Composting Facilities

Odors generated from landfills and composting facilities are typically associated with methane production from the anaerobic decomposition of waste. Lead agencies should consider applying the mitigation measures below to reduce and treat methane in facilities. Landfill projects should also implement best management practices to avoid and minimize the creation of anaerobic conditions.

1. Passive Gas Collection
2. Active Gas Collection
3. Flaring or energy production/utilization
4. Vegetation Growth on Landfill Cover
5. Cover/Cap Landfill
6. Odor Neutralizing Spray
7. Negative aeration for compost facilities
8. Turning and mixing of compost piles



Facilities that are regulated by CalRecycle (e.g. landfill, composting, etc.) are required to have Odor Impact Minimization Plans (OIMP) in place and have procedures that establish fence line odor detection thresholds. The Air District recognizes a Lead Agency's discretion under CEQA to use established odor detection thresholds as thresholds of significance for CEQA review for CalRecycle regulated facilities with an adopted OIMP.

7.2.3. Petroleum Refinery

Odors generated from materials and processes associated with petroleum refineries include, but are not limited to, H₂S, SO₂, mercaptan, ammonia (NH₃), and petroleum coke. Installing the following current and feasible odor mitigation measures for petroleum refineries should be considered.

1. Water Injections to Hydrocracking Process
2. Vapor recovery system
3. Injection of masking odorants into process streams
4. Flare meters and controls
5. Wastewater circulation technology for Aerated Ponds
6. Exhaust stack and vent location with respect to receptors
7. Thermal oxidizers
8. Carbon absorption
9. Biofiltration/Bio Trickling Filters

7.2.4. Chemical Plant

Chemical plants can generate a variety of different odors (e.g., acrylates, phenols, and styrene) as a result of process emissions. The range of odor mitigation measures required for chemical plants may vary substantially depending on the type of odors produced. The odor mitigation measures could be applied to chemical plants.

1. Wet scrubbers (50–90 percent efficiency)
2. Catalytic oxidation (99 percent efficiency)
3. Thermal oxidation (90–99 percent efficiency)
4. Carbon adsorption (95 percent efficiency)
5. Exhaust stack and vent location with respect to receptors



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7.2.5. Food Services

Restaurants, especially fast food restaurants, can generate substantial sources of odors as a result of cooking processes and waste disposal. Char broilers, deep-fryers, and ovens tend to produce food odors that can be considered offensive to some people. The food waste produced by restaurants can putrefy if not properly managed, which can also produce objectionable odors. The follow mitigation measures are management practices and odor technology that can be used to reduce the amount odors generated by food services.

1. Integral grease filtration system or grease removal system
2. Baffle filters
3. Electrostatic precipitator
4. Water cooling/cleaning unit
5. Disposable pleated or bag filters



6. Activated carbon filters
7. Oxidizing pellet beds
8. Incineration
9. Catalytic conversion
10. Proper packaging and frequency of food waste disposal
11. Exhaust stack and vent location with respect to receptors

In conclusion, odor impacts can also be minimized, contained, or prevented by implementing technologies and design measures at the source, or through planning-based measures. Where odor sources and receptors cannot be physically separated to a degree where impacts would be minimized to less-than-significant level, disclosures of odor sources to prospective tenants of sensitive land uses should be used. Mitigation for odors that is both effective and feasible shall be selected on a case-by-case basis.



8. CONSTRUCTION-RELATED IMPACTS

Construction-related activities are those associated with the building of a project or plan components. Construction activities are typically short-term or temporary in duration; however, project-generated emissions could represent a significant impact with respect to air quality and/or global climate change. Construction-related activities will result in the generation of criteria air pollutants including carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM₁₀, and PM_{2.5}); precursor emissions such as, reactive organic gases (ROG) and oxides of nitrogen (NO_x), and GHGs from exhaust, fugitive dust, and off-gas emissions. Sources of exhaust emissions could include on-road haul trucks, delivery trucks, worker commute motor vehicles, and off-road heavy-duty equipment. Sources of fugitive emissions (e.g., PM dust) could include construction-related activities such as soil disturbance, grading, and material hauling. Sources of off-gas emissions could include asphalt paving and the application of architectural coatings.

The recommendations provided in this chapter only apply to assessing and mitigating construction-related impacts for individual projects. Construction-related assumptions and project-specific information assumed in CEQA analyses should accompany the quantitative analysis described below. Refer to Chapter 9 for recommendations for assessing and mitigating construction-related impacts at the plan level.

8.1. CRITERIA AIR POLLUTANTS AND PRECURSORS

8.1.1. Significance Determination

Step 1: Comparison of Project Attributes with Screening Criteria

The first step in determining the significance of construction-related criteria air pollutants and precursors is to compare the attributes of the proposed project with the applicable *Screening Criteria* listed in Chapter 3. If all of the *Screening Criteria* are met, construction of the proposed project would result in a less-than-significant impact to air quality. If not, then construction emissions need to be quantified.

Step 2: Emissions Quantification

BAAQMD recommends using URBEMIS to quantify construction emissions for proposed land use development projects and the Roadway Construction Emissions Model (RoadMod) for proposed linear projects such as, new roadway, roadway widening, or pipeline installation). The most current URBEMIS (currently version 9.2.4) should be used for emission quantification. Table 8-5 outlines summary guidelines for using URBEMIS. Refer to Appendix B for detailed instructions for modeling construction-generated emissions using URBEMIS and RoadMod.



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Step 3: Comparison of Unmitigated Emissions with Thresholds of Significance

Following quantification of project-generated construction-related emissions, the total average daily emissions of each criteria pollutant and precursor should be compared with the applicable *Threshold of Significance*. For instance, with respect PM₁₀ and PM_{2.5}, compare the total amount of emissions from both exhaust and fugitive sources with the applicable *Threshold of Significance*. If construction-related emissions have been quantified using multiple models or



model runs, sum the criteria air pollutants and precursor levels from each where said activities would overlap. In cases where the exact timing of construction activities is not known, sum any phases that could overlap to be conservative.

If daily average emissions of construction-related criteria air pollutants or precursors would not exceed any of the *Thresholds of Significance*, the project would result in a less-than-significant impact to air quality. If daily average emissions of construction-related criteria air pollutants or precursors would exceed any applicable *Threshold of Significance*, the proposed project would result in a significant impact to air quality and would require mitigation measures for emission reductions.

Step 4: Mitigation and Emission Reductions

For all proposed projects, BAAQMD recommends the implementation of all *Basic Construction Mitigation Measures* (Table 8.2) whether or not construction-related emissions exceed applicable *Thresholds of Significance*. In addition, all projects must implement any applicable air toxics control measures (ATCM). For example, projects that have the potential to disturb asbestos (from soil or building material) must comply with all the requirements of ARB's ATCM for Construction, Grading, Quarrying, and Surface Mining Operations. Only reduction measures included in the proposed project's description or recommended as mitigation in a CEQA-compliant environmental document can be included when quantifying mitigated emission levels. Refer to Appendix B for detailed instructions on how to use URBEMIS to quantify the effects of construction emissions mitigation measures.

Step 5: Comparison of Mitigated (Basic Mitigation) Emissions with Thresholds of Significance

Following quantification of project-generated construction-related emissions, compare the total average daily amount of mitigated (with implementation of *Basic Construction Mitigation Measures*) criteria air pollutants and precursors with the applicable *Thresholds of Significance*. If the implementation of BAAQMD-recommended *Basic Construction Mitigation Measures* would reduce all construction-related criteria air pollutants and precursors to levels below the applicable *Thresholds of Significance*, the impact to air quality would be less than significant. If emissions of any criteria air pollutant or precursor would exceed the applicable *Threshold of Significance*, the impact to air quality would be significant. Table 8-1 provides an example of significance determination methodology.

Step 6: Implement Additional Construction Mitigation Measures

BAAQMD recommends that all proposed projects, where construction-related emissions would exceed the applicable *Thresholds of Significance*, implement the *Additional Construction Mitigation Measures* (Table 8-3). The methodology for quantifying reductions of fugitive PM dust, exhaust, and off gas emissions associated with the implementation of these mitigation measures are discussed separately below (Table 8-3). Keep all of the changes recommended above with regards to the *Basic Construction Mitigation Measures*, as the emission reductions associated with these *Additional Construction Mitigation Measures* are considered additive. Please note that in RoadMod all of these associated reductions should be taken outside of the model, described in further detail in Appendix B.

Step 7: Comparison of Mitigated Emissions with Thresholds of Significance

Following quantification of project-generated construction-related emissions in accordance with the above BAAQMD-recommended methods, compare the total average daily amount of mitigated (with *Additional Construction Mitigation Measures* implemented) criteria air pollutants and precursors with the applicable *Thresholds of Significance*. If the implementation of additional mitigation measures would reduce all construction-related criteria air pollutants and precursors to levels below the applicable *Thresholds of Significance*, the impact to air quality would be reduced



to a less-than-significant level. If mitigated levels of any criteria air pollutant or precursor still exceed the applicable *Threshold of Significance*, the impact to air quality would remain significant and unavoidable.

Table 8-1 Example Construction Criteria Air Pollutant and Precursor Significance Determination					
Step	Emissions Source	Emissions (lb/day or tpy)			
		ROG	NO _x	PM ₁₀	PM _{2.5}
2	Fugitive Dust Emissions	-	-	A	A
	Mobile Sources	B	B	B	B
	Off-gassing	C	-	-	-
3	Total Unmitigated Emissions	B + C = D	B = D	A + B = D	A + B = D
4	Total Basic Mitigated Emissions	E	E	E	E
	BAAQMD Threshold	54 lb/day	54 lb/day	82 lb/day*	54 lb/day*
5	Basic Mitigated Emissions Exceed BAAQMD Threshold?	Is E > 54 lb/day? (If Yes, significant. Go to step 6. If No, less than significant)	Is E > 54 lb/day? (If Yes, significant. Go to step 6. If No, less than significant)	Is B* > 82 lb/day? (If Yes, significant. Go to step 6. If No, less than significant)	Is B* > 54 lb/day? (If Yes, significant. Go to step 6. If No, less than significant)
6	Total Additional Mitigated Emissions	F	F	F	F
7	Additional Mitigated Emissions Exceed BAAQMD Threshold?	Is F > 54 lb/day? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)	Is F > 54 lb/day? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)	Is F* > 82 lb/day? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)	Is F* > 54 lb/day? (If Yes, significant and unavoidable. If No, less than significant with mitigation incorporated)

* Applies to construction equipment exhaust only.
 Notes: tpy = tons per year.; lb/day = pounds per day; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ROG = reactive organic gases; Refer to Appendix D for support documentation.



8.1.2. Mitigating Criteria Air Pollutants and Precursors

Basic Construction Mitigation Measures

For all proposed projects, BAAQMD recommends the implementation of all *Basic Construction Mitigation Measures*, listed in Table 8-2, whether or not construction-related emissions exceed applicable *Thresholds of Significance*. Appendix B provides guidance on quantifying mitigated emission reductions using URBEMIS and RoadMod.

Table 8-2 Basic Construction Mitigation Measures Recommended for ALL Proposed Projects	
1.	All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2.	All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3.	All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4.	All vehicle speeds on unpaved roads shall be limited to 15 mph.
5.	All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6.	Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7.	All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8.	Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Additional Construction Mitigation Measures

BAAQMD recommends that all proposed projects, where construction-related emissions would exceed the applicable *Thresholds of Significance*, implement the *Additional Construction Mitigation Measures*. Table 8-3 lists the *Additional Construction Mitigation Measures*. Appendix B contains more detailed guidance on emission reductions by source type (i.e., fugitive dust and exhaust) for quantification in URBEMIS and RoadMod.



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**Table 8-3
Additional Construction Mitigation Measures Recommended for Projects with
Construction Emissions Above the Threshold**

1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
2. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
3. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
5. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
7. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
8. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
9. Minimizing the idling time of diesel powered construction equipment to two minutes.
10. The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NO_x reduction and 45 percent PM reduction compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.
11. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
12. Requiring that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NO_x and PM.
13. Requiring all contractors use equipment that meets CARB's most recent certification standard for off-road heavy duty diesel engines.



Assessing Mitigation Measures

Table 8-4 provides a summary of BAAQMD recommendations for assessing construction-related impacts and mitigation measures using URBEMIS. Detailed guidance is provided in Appendix B.

Table 8-4 URBEMIS Guidance for Assessing Construction-Related Impacts	
URBEMIS Construction Input Parameter	Guidance Principle
Land Use Type and Size	<ul style="list-style-type: none"> • Select most applicable land use type. • Use the appropriate land use units.
Construction Schedule	<ul style="list-style-type: none"> • Use the earliest possible commencement date(s) if project-specific information is unknown. • Overlap phases that will or have the potential to occur simultaneously. • Check the selected number of work days per week to ensure an accurate number of construction work days for each phase.
Demolition Phase	<ul style="list-style-type: none"> • Use a separate demolition URBEMIS run if the land use size to be developed differs from the land use size to be demolished. • Demolition fugitive dust is based on maximum daily volume of building to be demolished. • Demolition construction equipment is based on acres of land use to be demolished (in <i>Enter Land Use Data</i> module).
Site Grading Phase	<ul style="list-style-type: none"> • Site grading construction equipment is based on maximum daily acres disturbed. • Enter project-specific maximum daily acres disturbed if known, otherwise URBEMIS assumes the maximum daily amount of acres disturbed is 25 percent of total acres disturbed.
Site Grading Fugitive Dust	<ul style="list-style-type: none"> • Select the appropriate fugitive dust quantification methodology based on the amount and type of project-specific information available. • The more specific grading information available will result in more accurate quantification of PM emissions.
Asphalt Paving Phase	<ul style="list-style-type: none"> • Acres to be asphalt paved are based on land use type and size (in <i>Enter Land Use Data</i> module). • Asphalt paving construction equipment is based on total acres to be paved. • Assumes asphalt paving occurs at equal rate throughout phase. • Account for excess asphalt paving requirements of project beyond default assumptions by adjusting the acres to be paved.
Architectural Coatings	<ul style="list-style-type: none"> • Assumes architectural coating operations occur at equal rate throughout phase.
Basic Construction Mitigation Measures	<ul style="list-style-type: none"> • All projects must implement Basic Construction Mitigation Measures, including those below the construction screening levels. • Use surrogate URBEMIS mitigation to account for Basic Construction Mitigation Measures' emission reductions.
Additional Construction Mitigation Measures	<ul style="list-style-type: none"> • Projects with construction emissions that exceed the thresholds are required to implement Additional Construction Mitigation Measures. • Use surrogate URBEMIS mitigation to account for Additional Construction Mitigation Measures' emission reductions.
Other	<ul style="list-style-type: none"> • For all construction phases, the more specific information available will result in more accurate emissions quantification. • When a specific construction schedule is unknown, all phases that could potentially overlap should be added to calculate maximum daily emissions.



8.2. GREENHOUSE GASES

The District does not have an adopted *Threshold of Significance* for construction-related GHG emissions. However, the Lead Agency should quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals. BAAQMD recommends using URBEMIS for proposed land use development projects and RoadMod for proposed projects that are linear in nature. Sources of construction-related GHGs only include exhaust, for which the same detailed guidance as described for criteria air pollutants and precursors should be followed.

The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as applicable. Best management practices may include, but are not limited to: using alternative fueled (e.g., biodiesel, electric) construction vehicles/equipment of at least 15 percent of the fleet; using local building materials of at least 10 percent; and recycling or reusing at least 50 percent of construction waste or demolition materials.

8.3. TOXIC AIR CONTAMINANTS

BAAQMD recommends that the same community risk and hazard *Threshold of Significance* for project operations be applied to construction. However, BAAQMD suggests associated impacts should be addressed on a case-by-case basis, taking into consideration the specific construction-related characteristics of each project and proximity to off-site receptors, as applicable. The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.

BAAQMD has developed guidance for estimating risk and hazards impacts entitled *Recommended Methods for Screening and Modeling Local Risks and Hazards* (May 2010) which also includes recommendations for mitigation of significant risk and hazards impacts. The Air District has also developed a Construction Risk Calculator model that provides distances from a construction site, based on user-provided project date, where the risk impacts are estimated to be less than significant; sensitive receptors located within these distances would be considered to have potentially significant risk and hazards impacts from construction. The Construction Risk Calculator can be downloaded from the Air District web site at:

<http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx>.

8.3.1. Diesel Particulate Matter

Construction-related activities could result in the generation of TACs, specifically diesel PM, from on-road haul trucks and off-road equipment exhaust emissions. Due to the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet (ARB 2005). In addition, current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of health risk. Additionally, the implementation of the *Basic Construction Mitigation Measures* (table 8-2), which is recommended for all proposed projects, would also reduce diesel PM exhaust emissions.



However, these variability issues associated with construction do not necessarily minimize the significance of possible impacts.

The analysis shall disclose the following about construction-related activities:

1. Types of off-site receptors and their proximity to construction activity within approximately 1,000 feet;
2. Duration of construction period;
3. Quantity and types of diesel-powered equipment;
4. Number of hours equipment would be operated each day;
5. Location(s) of equipment use, distance to nearest off-site sensitive receptors, and orientation with respect to the predominant wind direction;
6. Location of equipment staging area; and
7. Amount of on-site diesel-generated PM_{2.5} exhaust (assuming that all on-site diesel PM_{2.5} exhaust is diesel PM) if mass emission levels from construction activity are estimated.

In cases where construction-generated emissions of diesel PM are anticipated to occur in close proximity to sensitive receptors for extended periods of time, lead agencies are encouraged to consult with BAAQMD.

8.3.2. Demolition and Renovation of Asbestos-Containing Materials

Demolition of existing buildings and structures would be subject to BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing). BAAQMD Regulation 11, Rule 2 is intended to limit asbestos emissions from demolition or renovation of structures and the associated disturbance of asbestos-containing waste material generated or handled during these activities. The rule addresses the national emissions standards for asbestos along with some additional requirements. The rule requires the Lead Agency and its contractors to notify BAAQMD of any regulated renovation or demolition activity. This notification includes a description of structures and methods utilized to determine whether asbestos-containing materials are potentially present. All asbestos-containing material found on the site must be removed prior to demolition or renovation activity in accordance with BAAQMD Regulation 11, Rule 2, including specific requirements for surveying, notification, removal, and disposal of material containing asbestos. Therefore, projects that comply with Regulation 11, Rule 2 would ensure that asbestos-containing materials would be disposed of appropriately and safely. By complying with BAAQMD Regulation 11, Rule 2, thereby minimizing the release of airborne asbestos emissions, demolition activity would not result in a significant impact to air quality.

Because BAAQMD Regulation 11, Rule 2 is in place, no further analysis about the demolition of asbestos-containing materials is needed in a CEQA document. BAAQMD does recommend that CEQA documents acknowledge and discuss BAAQMD Regulation 11, Rule 2 to support the public's understanding of this issue.

8.3.3. Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) was identified as a TAC in 1986 by ARB. NOA is located in many parts of California and is commonly associated with ultramafic rocks, according to the California Department of Geology's special publication titled [Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California](#). Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Ultramafic rocks form in high-temperature environments well below the surface of the earth. By the time they are exposed at the surface by geologic uplift and erosion, ultramafic rocks may be partially to completely altered into a type of metamorphic rock called serpentinite.



Sometimes the metamorphic conditions are right for the formation of chrysotile asbestos or tremolite-actinolite asbestos in the bodies of these rocks, along their boundaries, or in the soil.

For individuals living in areas of NOA, there are many potential pathways for airborne exposure. Exposures to soil dust containing asbestos can occur under a variety of scenarios, including children playing in the dirt; dust raised from unpaved roads and driveways covered with crushed serpentine; grading and earth disturbance associated with construction activity; quarrying; gardening; and other human activities. For homes built on asbestos outcroppings, asbestos can be tracked into the home and can also enter as fibers suspended in the air. Once such fibers are indoors, they can be entrained into the air by normal household activities, such as vacuuming (as many respirable fibers will simply pass through vacuum cleaner bags).

People exposed to low levels of asbestos may be at elevated risk (e.g., above background rates) of lung cancer and mesothelioma. The risk is proportional to the cumulative inhaled dose (quantity of fibers), and also increases with the time since first exposure. Although there are a number of factors that influence the disease-causing potency of any given asbestos (such as fiber length and width, fiber type, and fiber chemistry), all forms are carcinogens.

8.3.4. Mitigating Naturally Occurring Asbestos

BAAQMD enforces CARB's ATCM which regulates NOA emissions from grading, quarrying, and surface mining operations at sites which contain ultramafic rock. The provisions that cover these operations are found specifically in the California Code of Regulations, Section 93105. The ATCM for Construction, Grading, Quarrying and Surface Mining Operations was signed into State law on July 22, 2002, and became effective in the SFBAAB on November 19, 2002. The purpose of this regulation is to reduce public exposure to NOA from construction and mining activities that emit or re-suspend dust which may contain NOA.

The ATCM requires regulated operations engaged in road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas where NOA is likely to be found, to employ the best available dust mitigation measures to reduce and control dust emissions. Tables 8-2 and 8-3 list a number of dust mitigation measures for construction.

BAAQMD's NOA program requires that the applicable notification forms from the Air District's website be submitted by qualifying operations in accordance with the procedures detailed in the ATCM Inspection Guidelines Policies and Procedures. The Lead Agency shall reference BAAQMD's ATCM Policies and Procedures to determine which NOA Notification Form is applicable to the proposed project ([NOA Notification Forms](#)).

Using the geologic map of the SFBAAB ([Geologic Map](#)), the Lead Agency shall discuss whether a proposed project would be located in "areas moderately likely to contain NOA." If a project would not involve earth-disturbing construction activity in one of these areas or would not locate receptors in one of these areas then it can be assumed that the project would not have the potential to expose people to airborne asbestos particles.



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PART III: ASSESSING & MITIGATING PLAN LEVEL IMPACTS

9. PLAN-LEVEL IMPACTS

Long range plans (e.g., general plan, redevelopment plans, specific plans, area plans, community plans, regional plans, congestion management plans, etc.) present unique challenges for assessing impacts. These plans often contain development strategies for 20-year, or longer, time horizons. They can also provide for a wide range of potential land uses and densities that accommodate all types of development. General plan updates and large specific plans nearly always require the Lead Agency to prepare an Environmental Impact Report (EIR).

Due to the SFBAAB's nonattainment status for ozone and PM, and the

cumulative impacts of growth on air quality, these plans almost always have significant, unavoidable adverse air quality impacts. CEQA requires the Lead Agency to evaluate individual as well as cumulative impacts of general plans, and all feasible mitigation measures must be incorporated within the proposed plan to reduce significant air quality impacts.



This chapter provides guidance on methods to evaluate air quality and climate change impacts of long-range plans prepared within the SFBAAB pursuant to CEQA. The term *general and area plan* refers broadly to discretionary planning activities which may include, but are not limited to the following: general plans, redevelopment plans, specific plans, area plans, community plans, congestion management plans, and annexations of lands and service areas. General and area plans are often subject to program-level analysis under CEQA, as opposed to project-level analysis. As a general principle, the guidance offered within this chapter should be applied to discretionary, program-level planning activities; whereas the project-level guidance offered in other chapters should be applied to individual project-specific approvals, such as a proposed development project.

Air quality impacts from future development pursuant to general or area plans can be divided into construction-related impacts and operational-related impacts. Construction-related impacts are associated with construction activities likely to occur in conjunction with future development allocated by the plan. Operational-related impacts are associated with continued and future operation of developed land uses, including increased vehicle trips and energy use.

Please note that the plan-level approach described here differs for greenhouse gas (GHG) impact assessments. The Air District recommends that when assessing GHG impacts for plans other than regional plans (transportation and air quality plans) and general plans, such as specific plans and area plans, the appropriate thresholds and methodology is the same as project-level GHG impact assessments described in Chapter 4.

Regional plan (transportation and air quality plans) impacts also are assessed differently because of their unique characteristics (regional plans do not establish land use designations) and are subject to a threshold of “no net increase in emissions.”



9.1. CRITERIA AIR POLLUTANTS AND PRECURSOR EMISSIONS

To meet the *Threshold of Significance* for operational-related criteria air pollutant and precursor impacts for plans (other than regional plans), a proposed plan must satisfy the following criteria:

- Consistency with current air quality plan (AQP) control measures (this requirement applies to project-level as well as plan-level analyses).
- A proposed plan's projected VMT or vehicle trips (VT) (either measure may be used) increase is less than or equal to its projected population increase.

Air Quality Plan Control Measures

For this threshold, an air quality plan refers to clean air plans, state implementation plans (SIPS), ozone plans, and other potential air quality plans developed by BAAQMD. To date, the Air District's most current plan is the 2010 Clean Air Plan.

The following approach for incorporating current AQP control measures into a plan is also applicable for determining a project's consistency with an air quality plan. CEQA requires lead agencies to determine whether a project is consistent with all applicable air quality plans. In addition, the State CEQA Guidelines sample Environmental Checklist Form (Appendix G), poses the question: "Would the project conflict with or obstruct implementation of the applicable air quality plan?"

BAAQMD recommends that the agency approving a project where an air quality plan consistency determination is required analyze the project with respect to the following questions. If all the questions are concluded in the affirmative, and those conclusions are supported by substantial evidence, the Air District considers the project consistent with air quality plans prepared for the Bay Area.

1. Does the project support the primary goals of the AQP?

The primary goals of the 2010 Bay Area Clean Air Plan (CAP), the current AQP to date, are to:

- Attain air quality standards;
- Reduce population exposure and protecting public health in the Bay Area; and
- Reduce greenhouse gas emissions and protect the climate.

Any project (i.e. project or plan) that would not support these goals would not be considered consistent with the 2010 CAP. The recommended measure for determining project support of these goals is consistency with District-approved CEQA thresholds of significance. Therefore, if approval of a project would not result in significant and unavoidable air quality impacts, after the application of all feasible mitigation, the project would be considered consistent with the 2010 CAP.

2. Does the project include applicable control measures from the AQP?

Agencies approving projects should require that they include all air quality plan control measures that can feasibly be incorporated into the project design or applied as mitigation, or justify the reasons, supported by substantial evidence, why a measure or measures are not incorporated into the project. Projects that incorporate all feasible air quality plan control measures are considered consistent with the 2010 CAP.



The 2010 CAP contains 55 control measures aimed at reducing air pollution in the Bay Area. Along with the traditional stationary, area, mobile source and transportation control measures, the 2010 CAP contains a number of new control measures designed to protect the climate and promote mixed use, compact development to reduce vehicle emissions and exposure to pollutants from stationary and mobile sources. BAAQMD encourages project developers and lead agencies to incorporate these Land Use and Local Impact (LUM) measures and Energy and Climate measures (ECM) into proposed project designs and plan elements.

Refer to Volume II of the 2010 CAP Control Measure for a list of all the control measures and implementation guidance.

3. Does the project disrupt or hinder implementation of any AQP control measures?

If approval of a project would not cause the disruption, delay or otherwise hinder the implementation of any air quality plan control measure, it would be considered consistent with the 2010 CAP. Examples of how a project may cause the disruption or delay of control measures include a project that precludes an extension of a transit line or bike path, or proposes excessive parking beyond parking requirements.

Projected VMT and Population Growth

A proposed plan must demonstrate that its projected VMT or vehicle trips (VT) (either measure may be used) is less than or equal to its projected population increase to be considered to have a less than significant impact on criteria air pollutants and precursor emissions.

9.2. GREENHOUSE GASES

California's legislative mandate (AB 32) is to reduce total projected 2020 GHG emissions to 1990 levels, a reduction of approximately 30 percent. To achieve this target, future development must be planned and implemented in the most GHG-efficient manner possible. GHG-efficient development reduces vehicle miles traveled by supporting compact, dense, mixed-use, pedestrian- and bicycle-friendly, transit oriented development. State, regional and local agencies are strongly encouraged to address GHG emissions when updating and/or adopting long-range plans. For local jurisdictions, the general plan is perhaps the best venue for addressing GHG emissions in making meaningful progress toward attaining AB 32 goals while addressing CEQA requirements.



If a long-range plan includes goals, policies, performance standards, and implementation measures achieving GHG emission reductions that can be shown to meet and/or exceed AB 32 mandates, as outlined in Section 4.3, subsequent projects consistent with the plan could be relieved of performing GHG analysis as part of their CEQA compliance.

The *Threshold of Significance* for operational-related GHG impacts of plans employs either a GHG efficiency-based metric of 6.6 MT per SP per year of carbon dioxide equivalent (CO_{2e}), or a GHG Reduction Strategy option. Unlike the other plan-level thresholds that apply to the different

plans mentioned in Section 9 above, the GHG efficiency threshold may only be applied to general plans. A Lead Agency may also determine that this threshold is appropriate for a GHG Reduction Strategy's 2020 milestone target. GHG Reduction Strategies using this threshold with horizon years beyond 2020 should consider horizon-year goals consistent with climate stabilization predictions identified in the Governor's Executive Order S-03-05.

Step 1. GHG Reduction Strategy Approach

A long-range plan would be assumed to have a less than significant impact related to GHG emissions if the Lead Agency has a qualified GHG Reduction Strategy that is referenced and or integrated within the long-range plan. See Chapter 4 for qualifying criteria for a qualified GHG Reduction Strategy.

If the Lead Agency does not have a qualified GHG Reduction Strategy meeting established criteria, refer to Step 2.

Step 2. GHG Efficiency Approach – Emissions Quantification



BAAQMD recommends quantifying community-wide GHG emissions from a general or area plan through development of a GHG emissions inventory and projections report. The emissions inventory should be conducted for a base year at or before the current year of the plan; and should follow published ARB protocols for municipal and community-wide inventories (when available). The base year inventory should be expressed in terms of metric tons CO_{2e} emissions and account for municipal and community-wide emission sectors applicable in the jurisdiction such as, transportation, commercial, residential, water use and treatment, solid waste, and agriculture.

Section 4.3 contains additional guidance on preparing a GHG emissions inventory and projections report for a qualified GHG Reduction Strategy that should be applied to general plans as well. A range of tools and resources are available to assist lead agencies in completing inventories, including the Air District's *GHG Plan Level Reduction Strategy Guidance*, *Intergovernmental Panel on Climate Change (IPCC) Emissions Inventory Guidelines*, *CCAR GRP*, and *ICLEI's Clean Air and Climate Protection (CACP) model*. In all instances where regional, statewide or national data sources are available, the Air District recommends that local data be used if available and more accurate.

Step 3. Prepare Greenhouse Gas Emissions Projections

BAAQMD recommends preparing a community-wide GHG emission projection to identify the expected levels of GHG emissions for: 1) 2020 (i.e., the AB 32 benchmark year), and 2) the projected year of the plan build out. Two projections should be prepared for each year:

- A projection reflecting existing conditions (e.g., business-as-usual), and
- A projection that accounts for proposed policies, programs, and plans included within the general or area plan that would reduce GHG emissions from build-out of the plan.

The first projection should be used as the basis for evaluation of the no project alternative in the plan's EIR. The second projection should be used as the basis for evaluation of the proposed project. Additional projections corresponding to plan alternatives considered within the EIR should



also be prepared and included within the EIR's alternatives analysis. Examples of policies, performance standards and implementation measures are included in Section 9.5.

Where possible, emission projections should account for inherent improvements in energy and fuel efficiency, population and employment growth rates published by ABAG, VMT growth rates available from MTC, energy consumption growth rates available from California Energy Commission (CEC) planned expansions of municipal infrastructure or services, and anticipated statewide legislative requirements or mandates (e.g., Renewable Energy Portfolio, Green Building Code Standards, on-road vehicle emission regulations).

A range of GIS-based planning models are available that can assist lead agencies in completing projections, including Index, PLACE3S, UPlan, and the Sustainable Systems Integration Model (SSIM). The projection should be expressed in metric tons CO₂e emissions, and include the expected municipal and community-wide emissions across all sectors evaluated in the base year inventory.

BAAQMD encourages lead agencies to prepare similar projections for 2050 (the Executive Order S-03-05 benchmark year). As we approach the 2020 timeframe, BAAQMD will reevaluate this significance threshold to better represent progress toward 2050 goals. The Lead Agency should use the projected build-out emissions profile of the general or area plan as a benchmark to ensure that adoption of the plan would not preclude attainment of 2050 goals.

Step 4. Determine Planned Population and Employment Levels and Service Population

State law requires that general and area plans identify the planned density and intensity of land uses for all lands within the planning area established by the Lead Agency. These measures of density (typically dwelling units/acre) and intensity (typically floor-area ratios) are often translated into expected population and employment levels for estimating traffic impacts associated with the proposed plan. Most demand-based transportation models use population and employment to determine trip generation. Measures of population and employment are typically available for general and area plans. In evaluating GHG impacts, estimates of the number of residents and jobs anticipated in the general or area plan are required for 2020, the build-out year of the proposed plan, the no project alternative, and additional alternatives the Lead Agency is evaluating in the environmental review.

Service population (SP) is an efficiency-based measure used by BAAQMD to estimate the development potential of a general or area plan. SP is determined by adding the number of residents to the number of jobs estimated for a given point in time. For purposes of evaluating GHG impacts, SP estimates are required for 2020 and for the build-out year of the proposed plan.

Step 5. Compare Service Population to 2020 GHG Projections and Thresholds of Significance

The Lead Agency should divide the 2020 GHG emissions inventory by 2020 SP estimates to determine the per-SP emissions associated with the proposed general or area plan, the no project alternative, and additional alternatives the Lead Agency is evaluating. The Lead Agency should then compare these per-SP emissions to the significance thresholds identified in Chapter 2 (refer to Table 9-1).



Step	Emissions Source	Year	Emissions (MT CO ₂ e/yr)*
2	GHG Emissions Inventory (Community-wide and municipal)	Base year (e.g., 2007)	A
3	GHG Emissions Projections	2020	B
		GP Buildout (e.g., 2030)	C
4	Projected Service Population (population + employment)	SP	
	GHG/SP (2020)	B/SP (MT CO ₂ e/SP/yr)	
5	BAAQMD GHG/SP Threshold	6.6 (MT CO ₂ e/SP/yr)	
	Is B/SP > 6.6? (If Yes, Significant. Proceed to Step 6. If No, less than significant).		

*Letters "A", "B", and "C" are used to represent numeric values that would be obtained through conducting a community-wide emissions inventory and projections.
Notes: CO₂e = carbon dioxide equivalent; MT = metric tons; yr = year, P = population, SP = service population.
Refer to Appendix D for support documentation.

If the estimated per-SP emissions exceed identified thresholds, the general or area plan would be considered to have a significant impact with respect to GHG emissions, and mitigation would be required.

Step 6. Mitigation Measures

General or area plans found to have a significant impact should implement all feasible mitigation measures to reduce impacts. Refer to Section 9.5 for examples of appropriate mitigation measures for operational impacts relative to GHG emissions. Mitigation measures identified through the environmental review process must be made into binding and enforceable policies and implementation programs within the long range plan.

9.3. LOCAL COMMUNITY RISK AND HAZARD IMPACTS⁶

For general and area plans to have a less-than-significant impact with respect to potential toxic air contaminants (TACs), special overlay zones need to be established around existing and proposed land uses that emit TACs. Special overlay zones should be included in proposed plan policies, land use maps, and implementing ordinances.

The *Thresholds of Significance* for plans with regard to community risk and hazard impacts are:

1. The land use diagram must identify:
 - a. Special overlay zones around existing and planned sources of TACs;



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⁶ The use of the receptor thresholds is discussed in section 2.8 of these Guidelines



- b. Special overlay zones of at least 500 feet (or Air District-approved modeled distance) on each side of all freeways and high-volume roadways.
2. The plan must also identify goals, policies, and objectives to minimize potential impacts and create overlay zones for sources of TACs and receptors.

ARB's Land Use Handbook offers advisory recommendations for locating sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, chrome platers, dry cleaners, gasoline stations, and other industrial facilities, to reduce exposure of sensitive populations. The Lead Agency should refer to this handbook when evaluating whether the proposed general or area plan includes adequate buffer distances between TAC sources and sensitive receptors.

9.3.1. Community Risk Reduction Plans

The goal of a Community Risk Reduction Plan (CRRP) would be to bring TAC and PM_{2.5} concentrations for the entire community covered by the Plan down to acceptable levels as identified by the local jurisdiction and approved by the Air District. This approach provides local agencies a proactive alternative to addressing communities with high levels of risk on a project-by-project approach.

A qualified Community Risk Reduction Plan adopted by a local jurisdiction should include, at a minimum, the following elements:

- (A) Define a planning area;
- (B) Include base year and future year emissions inventories of TACs and PM_{2.5};
- (C) Include Air District–approved risk modeling of current and future risks;
- (D) Establish risk and exposure reduction goals and targets for the community in consultation with Air District staff;
- (E) Identify feasible, quantifiable, and verifiable measures to reduce emissions and exposures;
- (F) Include procedures for monitoring and updating the inventory, modeling and reduction measures in coordination with Air District staff; and
- (G) Be adopted in a public process following environmental review.

Refer to Chapter 5 for additional guidance on preparing a CRRP. The Air District has also developed the *Community Risk Reduction Plan Methodology* guidance document, which can be found at <http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx>.

9.4. ODOR IMPACTS

- For plans to have a less-than-significant impact, a plan must identify the location of existing and planned odor sources in the plan area. The plan must also include policies to reduce potential odor impacts in the plan area.



9.5. REGIONAL PLANS

Regional plans must demonstrate a no net increase in emissions to satisfy the *Threshold of Significance* for operational-related criteria air pollutant and precursor impacts, GHGs, and toxic air contaminants.

Regional plans include the Regional Transportation Plan prepared by the Metropolitan Transportation Commission (MTC) and air quality plans prepared by the Air District. In order to meet this threshold, these agencies must compare the regional plan's baseline emissions with its projected future emissions. This approach requires two comparative analyses:

- a. Compare existing (base year) emissions with projected future year plus project emissions (base year/project comparison);
- b. Compare projected future year emissions without the project with projected future year emissions plus the project (no project/project comparison).

A regional plan is considered less than significant if each scenario demonstrates that no net increase in emissions of criteria air pollutants and precursors, GHGs, and toxic air contaminants will occur.

9.6. MITIGATING PLAN-LEVEL IMPACTS

Plans often have significant, unavoidable adverse air quality impacts due to the SFBAAB's nonattainment status and the cumulative impacts of growth on air quality. In addition, plans generally have long-term planning horizons of twenty years or more. For these reasons, it is essential for plans to incorporate all feasible strategies and measures to reduce air quality impacts. Mitigation measures for plans are often broad in scope due to the long timeframe and comprehensive nature of general and area plan policies and programs.

This section contains mitigation measures recommended for plans prepared within the SFBAAB. Measures are identified by state-required general plan element, planning issue, development phase, and type of air quality impact. Proposed plans should incorporate mitigation measures applicable to their elements and planning issues.

Plans are the appropriate place to establish community-wide air quality policies that reinforce regional air quality plans. Plans present opportunities to establish requirements for new construction, future development, and redevelopment projects within a community that will ensure new or revised plans do not inhibit attainment of state and national air quality standards and actually assist in improving local and regional air quality. Binding, enforceable mitigation measures identified through the environmental review process should be incorporated as policies and implementation programs within the plan to the



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greatest extent feasible. Ideally, air quality related goals, policies, performance measures and standards should be incorporated within the context of the proposed project itself, rather than introduced as corrective actions within the proposed project's EIR. The list below is not intended to serve as an exhaustive list. The Air District also recommends that Lead Agencies refer to CAPCOA's *Model Policies for Greenhouse Gases in General Plans* (June 2009) for additional guidance (<http://www.capcoa.org/modelpolicies/CAPCOA-ModelPolicies-6-12-09-915am.pdf>).

9.6.1. Qualified Greenhouse Gas Reduction Strategy

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Develop and adopt a comprehensive Qualified GHG Reduction Strategy that includes: baseline inventory of greenhouse gas emissions from all sources, greenhouse gas emissions reduction targets that are consistent with the goals of AB 32, and enforceable GHG emission reduction strategies and performance measures.		X				X		
Qualified GHG Reduction Strategy to include enforcement and monitoring tools to ensure regular review of progress toward the emission reduction targets, report progress to the public and responsible agencies, and revise the plan as appropriate.		X				X		

9.6.2. Land Use Element

Urban Form

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Create and enhance landscaped greenway, trail, and sidewalk connections between neighborhoods, commercial areas, activity centers, and parks.					X	X		
Adopt policies supporting infill development					X	X		
Ensure that proposed land uses are supported by a multi-modal transportation system and that the land uses themselves support the development of the transportation system.					X	X		
Designate a central city core for high-density and mixed-use development.					X	X		
Discourage high intensity office and commercial uses from locating outside of designated centers or downtowns, or far from residential areas and transit stations.					X	X		
Provide financial incentives and density bonuses to entice development within the designated central city.					X	X		
Provide public education about benefits of well-designed, higher-density housing and relationships between land use and transportation.					X	X		



Compact Development

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Achieve a jobs/housing balance or improve the jobs/housing ratio within the plan area.					X	X		
Create incentives to attract mixed-use projects to older commercial and industrial areas.					X	X		
Adopt incentives for the concurrent development of retail, office, and residential land uses within mixed-use projects or areas. Require mixed-use development to include ground-floor retail.					X	X		
Provide adaptive re-use alternatives to demolition of historic buildings. Provide incentives to prevent demolition of historic buildings.	X	X			X	X		
Facilitate lot consolidation that promotes integrated development with improved pedestrian and vehicular access.					X	X		
Reinvest in existing neighborhoods and promote infill development as a preference over new, greenfield development.					X	X		
Ensure that new development finances the full cost of expanding public infrastructure and services to provide an economic incentive for incremental expansion.					X	X		
Require new developments to extend sewer and water lines from existing systems or to be in conformance with a master sewer and water plan.	X	X			X	X		

Transit-oriented Design

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Require all development projects proposed within 2,000 feet of an existing or planned light rail transit, commuter rail, express bus, or transit corridor stop, to incorporate site design measures that enhance the efficiency of the transit system.					X	X		
Develop transit/pedestrian-oriented design guidelines. Identify and designate appropriate sites during general plan updates and amendments.					X	X		
Plan areas within ¼-mile of locations identified as transit hubs and commercial centers for higher density development.					X	X		



Sustainable Development

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Ensure new construction complies with California Green Building Code Standards and local green building ordinances.					X	X		
Promote re-use of previously developed property, construction materials, and/or vacant sites within a built-up area.					X	X		
Avoid development of isolated residential areas near hillsides or other areas where such development would require significant infrastructure investment or adversely impact biological resources.						X		
Require orientation of buildings to maximize passive solar heating during cool seasons, avoid solar heat gain during hot periods, enhance natural ventilation, and promote effective use of daylight. Orientation should optimize opportunities for on-site solar generation.					X	X		
Provide land area zoned for commercial and industrial uses to support a mix of retail, office, professional, service, and manufacturing businesses.					X	X		
Provide permitting incentives for energy efficient and solar building projects.					X	X		
Develop a joint powers agreement or other legal instrument that provides incentive for counties to discourage urban commercial development in unincorporated areas and promote urban infill and redevelopment projects.					X	X		

Activity Centers

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Provide pedestrian amenities, traffic-calming features, plazas and public areas, attractive streetscapes, shade trees, lighting, and retail stores at activity centers.					X	X		
Provide for a mix of complementary retail uses to be located together to create activity centers and commercial districts serving adjacent neighborhoods.					X	X		
Permit upper-story residential and office uses in neighborhood shopping areas.					X	X		
Provide pedestrian links between commercial districts and neighborhoods.					X	X		
Provide benches, streetlights, public art, and other amenities in activity centers to attract pedestrians.					X	X		



Green Economy and Businesses

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Work with businesses to encourage employee transit subsidies and shuttles from transit stations.					X	X		
Encourage businesses to participate in local green business programs.					X	X		
Offer incentives to attract businesses to city core and infill areas.					X	X		
Work to attract green businesses and promote local green job training programs.					X	X		
Support regional collaboration to strengthen the green economy.					X	X		
Provide outreach and education to local businesses on energy, waste, and water conservation benefits and cost savings.					X	X		
Support innovative energy technology companies.					X	X		

9.6.3. Circulation Element

Local Circulation

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Create or reinforce a grid street pattern with small block sizes and maintain high connectivity within the roadway network.					X	X		
Implement circulation improvements that reduce vehicle idling, such as signal timing systems and controlled intersections.					X	X	X	
Consider alternatives such as increasing public transit or improving bicycle or pedestrian travel routes before funding transportation improvements that increase VMT.					X	X		
Require payment of transportation impact fees and/or roadway and transit improvements as a condition upon new development.					X	X		
Minimize use of cul-de-sacs and incomplete roadway segments.					X	X		
Actively promote walking as a safe mode of local travel, particularly for children attending local schools.					X	X		
Consult with school districts, private schools, and other operators to coordinate local busing, to expand ride-sharing programs, and to replace older diesel buses with low or zero emission vehicles.					X	X	X	
Evaluate all busing options as a preferential strategy to roadway improvements in the vicinity of schools to ease congestion.					X	X		
Establish public/private partnerships to develop satellite and neighborhood work centers for telecommuting.					X	X		
Employ traffic calming methods such as median landscaping and provision of bike or transit lanes to slow traffic, improve roadway capacity, and address safety issues.					X	X		
Support the use of electric vehicles where appropriate. Provide electric recharge facilities.					X	X		



Regional Transportation

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Ensure that submittals of transportation improvement projects to be included in regional transportation plans (RTP, RTIP, CMP, etc.) are consistent with the air quality goals and policies of the general plan.					X	X		
Consult with adjacent jurisdictions to address the impacts of regional development patterns on the circulation system.					X	X		
Adopt a (or implement the existing) Transportation Demand Management Ordinance.					X	X		
Create financing programs for the purchase or lease of vehicles used in employer ride sharing programs.					X	X		
Consult with adjacent jurisdictions to maintain adequate service levels at shared intersections and to provide adequate capacity on regional routes for through traffic.					X	X		
Work to provide a strong paratransit system that promotes the mobility of all residents and educate residents about local mobility choices.					X	X		
Designate sites for park-and-ride lots. Consider funding of the park and ride lots as mitigation during CEQA review of residential development projects.					X	X		
Consult with appropriate transportation agencies and major employers to establish express buses and vanpools to increase the patronage of park and ride lots.					X	X		
Allow developers to reach agreements with auto-oriented shopping center owners to use commercial parking lots as park-and-ride lots and multimodal transfer sites.					X	X		

Parking

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Reduce parking for private vehicles while increasing options for alternative transportation.					X	X		
Eliminate minimum parking requirements for new development.					X	X		
Establish commercial district parking fees.					X	X		
Require that parking is paid for separately and is not included in rent for residential or commercial space.					X	X		
Encourage parking sharing between different land uses.					X	X		
Encourage businesses to offer parking cash-outs to employees.					X	X		
Encourage parking assessment districts.					X	X		
Encourage car-share and bike-share programs and dedicated parking spaces in new development.					X	X		
Support preferential parking for low emission and carpool vehicles					X	X		



Bicycles and Pedestrians

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Provide safe and convenient pedestrian and bicycle connections to and from activity centers, commercial districts, offices, neighborhoods, schools, other major activity centers.					X	X		
Ensure that non-motorized transportation systems are connected and not interrupted by impassable barriers, such as freeways.					X	X		
Provide pedestrian pathways that are well-shaded and pleasantly landscaped to encourage use.					X	X		
Consult with transit providers to increase the number of bicycles that can be accommodated on buses.					X	X		
Provide crosswalks and sidewalks along streets that are accessible for people with disabilities and people who are physically challenged.					X	X		
Prohibit on-street parking to reduce bicycle/automobile conflicts in appropriate target areas.					X	X		
Prohibit projects that impede bicycle and walking access.					X	X		
Retrofit abandoned rail corridors as segments of a bikeway and pedestrian trail system.					X	X		
Require commercial developments and business centers to include bicycle amenities in building such as bicycle racks, showers, and lockers.					X	X		

Regional Rail Transit

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Support regional rail service and consult with rail operators to expand services.					X	X		
Create activity centers and transit-oriented development projects near transit stations.					X	X		

Local and Regional Bus Transit

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Give funding preference to investment in public transit over investment in infrastructure for private automobile traffic.					X	X		
Establish a local shuttle service to connect neighborhoods, commercial centers, and public facilities to rail transit.					X	X		
Empower seniors and those with physical disabilities who desire maximum personal freedom and independence of lifestyle with unimpeded access to public transportation.					X	X		
Provide transit shelters that are comfortable, attractive, and accommodate transit riders. Ensure that shelters provide shade, route information, benches and lighting.					X	X		
Design all arterial and collector streets planned as transit routes to allow for the efficient operation of public transit.					X	X		
Require transit providers to coordinate intermodal time schedules					X	X		



9.6.4. Conservation Element

Municipal Operations

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Replace existing City vehicles with ultra-low or zero emission vehicles and purchase new low emission vehicles.					X	X		
Require that all new government buildings, and all major renovations and additions, meet identified green building standards.					X	X		
Install cost-effective renewable energy systems on all city buildings and purchase remaining electricity from renewable sources.					X	X		
Support the use of teleconferencing in lieu of city/county employee travel to conferences and meetings when feasible.					X	X		
Require city/county departments to set up telecommuting programs as part of their trip reduction strategies.					X	X		
Require environmentally responsible government purchasing. Require or give preference to products that reduce or eliminate indirect GHG emissions.						X		
Investigate the feasibility of using solar (photovoltaic) street lights instead of conventional street lights to conserve energy.					X	X		
Support investment in cost-effective land use and transportation modeling and geographic information system technology.					X	X	X	X
Install LED lighting for all traffic light systems.						X		
Implement a timed traffic light system to reduce idling.					X	X		



Air Quality – Sensitive Receptors

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Develop and adopt a comprehensive Community Risk Reduction Plan that includes: baseline inventory of TAC and PM _{2.5} emissions from all sources, emissions reduction targets, and enforceable emission reduction strategies and performance measures. Community Risk Reduction Plan to include enforcement and monitoring tools to ensure regular review of progress toward the emission reduction targets, report progress to the public and responsible agencies, and revise the plan as appropriate.			X				X	
Require residential development projects and projects categorized as sensitive receptors to be located an adequate distance from existing and potential sources of TACs and odors.				X			X	X
Require new air pollution point sources such as, but not limited to, industrial, manufacturing, and processing facilities to be located an adequate distance from residential areas and other sensitive receptors.	X		X	X	X		X	X
Consult with BAAQMD to identify TAC sources and determine the need for and requirements of a health risk assessment for proposed developments.			X	X			X	X
Consult with project proponents during the pre-application review process to avoid inappropriate uses at affected sites and during the environmental review process for general plan amendments and general plan updates.					X		X	X
Require project proponents to prepare health risk assessments in accordance with BAAQMD-recommended procedures as part of environmental review when the proposed project has associated air-toxic emissions.			X				X	
Designate adequate industrial land in areas downwind and well-separated from sensitive uses.							X	X
Designate non-sensitive land uses for areas surrounding industrial sites.					X		X	X
Protect vacant industrial sites from encroachment by residential or other sensitive uses through appropriate zoning.					X		X	X
Require indoor air quality equipment, such as enhanced air filters, to be installed at schools, residences, and other sensitive receptor uses located near pollution sources.							X	X
Quantify the existing and added health risks to new sensitive receptors or for new sources.							X	
Utilize pollution absorbing trees and vegetation in buffer areas.					X	X	X	



Air Quality – PM₁₀ and Dust Control

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Include PM ₁₀ control measures as conditions of approval for subdivision maps, site plans, and grading permits.	X				X			
Minimize vegetation removal required for fire prevention.	X				X			
Require alternatives to discing, such as mowing, to the extent feasible. Where vegetation removal is required for aesthetic or property maintenance purposes, encourage or require alternatives to discing.	X	X			X	X		
Require subdivision designs and site planning to minimize grading and use landform grading in hillside areas.	X							
Condition grading permits to require that graded areas be stabilized from the completion of grading to commencement of construction.	X							
Require all access roads, driveways, and parking areas serving new commercial and industrial development to be constructed with materials that minimize particulate emissions and are appropriate to the scale and intensity of use.	X							
Develop a street cleaning program aimed at removing heavy silt loadings from roadways that result from sources such as storm water runoff and construction sites.	X				X			
Pave shoulders and pave or landscape medians. Curb and gutter installation may provide additional benefits where paving is contiguous to the curb.	X	X			X	X		

Water Conservation

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Require residential remodels and renovations to improve plumbing fixture and fixture-fitting water efficiency by an established amount above the California Building Standards Code water efficiency standards.		X						
Provide water use audits to identify conservation opportunities and financial incentives for adopting identified efficiency measures.		X						
Require use of native and drought-tolerant plants, proper soil preparation, and efficient irrigation systems for landscaping.		X				X		
Maximize use of native, low-water plants for landscaping of areas adjacent to sidewalks or other impermeable surfaces.		X				X		
Increase use of recycled and reclaimed water for landscaping projects.		X				X		
Adopt a water-efficient landscaping ordinance and implement the Bay-Friendly Landscaping Guidelines established by StopWaste.org.						X		
Provide public water conservation education.						X		
Reduce pollutant runoff from new development through use of Best Management Practices.	X	X	X		X	X	X	
Minimize impervious surfaces and associated urban runoff pollutants in new development and reuse projects.	X	X	X		X	X	X	
Utilize permeable surfaces and green roof technologies where appropriate.					X	X	X	



Energy Conservation

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Conduct energy efficiency audits of existing buildings by checking, repairing, and readjusting heating, ventilation, air conditioning, and lighting, water heating equipment, insulation and weatherization. Offer financial incentives for adoption of identified efficiency measures.		X				X		
Require implementation of energy-efficient design features in new development, including appropriate site orientation, exceedance of Title 24, use of light color roofing and building materials, and use of evergreen and wind-break trees to reduce heating and cooling fuel consumption.		X				X		
Adopt residential and commercial energy efficiency retrofit ordinances that require upgrades as a condition of issuing permits for renovations or additions, and on the sale of residences and buildings.		X				X		
Facilitate cooperation between neighboring development projects to use on-site renewable energy supplies or combined heat and power co-generation facilities.		X				X		
Develop a comprehensive renewable energy financing and informational program for residential and commercial uses.		X				X		
Partner with community services agencies to fund energy efficiency projects for low income residents.		X				X		
Encourage the installation of energy efficient fireplaces in lieu of normal open-hearth fireplaces. Prohibit installation of wood burning devices.	X	X			X	X		
Provide natural gas lines or electrical outlets to backyards to encourage the use of natural gas or electric barbecues, and electric gardening equipment.	X				X			
Implement Community Choice Aggregation (CCA) for renewable electricity generation.		X				X		

Solid Waste

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Achieve established local and regional waste-reduction and diversion goals. Adopt more stringent waste reduction goals.		X				X		
Establish programs that enable residents to donate or recycle surplus furniture, old electronics, clothing, and other household items.		X				X		
Establish methane recovery in local landfills and wastewater treatment plants to generate electricity.		X				X		
Participate or initiate a composting program for restaurants and residences.						X		
Implement recycling programs for businesses and construction waste.	X	X			X	X		
Prohibit styrofoam containers and plastic bag use by businesses.					X	X		



9.6.5. Open Space Element

Community Forestry

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Require inclusion of low VOC-emitting street trees and landscaping for all development projects.		X				X		
Require that trees larger than a specified diameter that are removed to accommodate development must be replaced at a set ratio.		X				X		
Provide adequate funding to manage and maintain the existing community forest, including sufficient funds for tree planting, pest control, scheduled pruning, and removal and replacement of dead trees.		X				X		
Provide public education regarding the benefits of street trees and the community forest.		X				X		

Sustainable Agriculture

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Require agricultural practices be conducted in a manner that minimizes harmful effects on soils, air and water quality, and marsh and wildlife habitat. Sustainable agricultural practices should be addressed in the Qualified GHG Reduction Strategy to address climate change effects if relevant.	X	X			X	X		
Preserve forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, groundwater recharge areas and other open spaces that provide carbon sequestration benefits.	X	X			X	X		
Establish a mitigation program for establishing conservation areas. Impose mitigation fees on development of such lands and use funds generated to protect existing, or create replacement, conservation areas.	X	X			X	X		
Require no-till farming, crop rotation, cover cropping, and residue farming.	X	X			X	X		
Require the use of appropriate vegetation within urban-agricultural buffer areas.		X				X		
Protect grasslands from conversion to non-agricultural uses.	X	X			X	X		
Support energy production activities that are compatible with agriculture, including biogas, wind and solar.		X				X		
Allow alternative energy projects in areas zoned for agriculture or open space where consistent with primary uses.		X				X		
Provide spaces within the community suitable for farmers markets.						X		
Promote local produce and garden programs at schools.						X		



Parks and Recreation

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Expand and improve community recreation amenities including parks, pedestrian trails and connections to regional trail facilities.						X		
Require payment of park fees and/or dedication and provision of parkland, recreation facilities and/or multi-use trails as a condition upon new development.		X				X		
Encourage development of pocket parks in neighborhoods. Improve equal accessibility to park space across communities.		X				X		
Encourage joint use of parks with schools and community centers and facilities.		X				X		

9.6.6. Housing Element

Affordable Housing

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Ensure a portion of future residential development is affordable to low and very low income households.		X				X		
Target local funds, including redevelopment and Community Development or Energy Efficiency Block Grant resources, to assist affordable housing developers in incorporating energy efficient designs and features.						X		
Adopt minimum residential densities in areas designated for transit-oriented, mixed use development to ensure higher density in these areas.					X	X		
Consult with the Housing Authority, transit providers, and developers to facilitate construction of low-income housing developments that employ transit-oriented and pedestrian-oriented design principles.					X	X		
Offer density-bonus incentives for projects that provide for infill, mixed use, and higher density residential development.					X	X		

9.6.7. Safety Element

Traffic Safety

Mitigation Measure or General/Area Plan Policy	Construction				Operational			
	CAPs	GHGs	TACs	Odors	CAPs	GHGs	TACs	Odors
Facilitate traffic safety for motorists and pedestrians through proper street design and traffic monitoring.					X	X		
Require traffic control devices, crosswalks, and pedestrian-oriented lighting within design of streets, sidewalks, trails, and school routes.					X	X		

A. CONSTRUCTION ASSESSMENT TOOLS

High Level Haulage Input Worksheet High Level of Detail Fugitive Dust Quantification Method

Instructions: When using the *High Level of Detail* quantification method to calculate fugitive dust emissions from cut/fill activities, BAAQMD recommends using this worksheet to calculate the on- and off-site haulage inputs for URBEMIS. If a project would involve both on-site and off-site cut/fill operations, the user should create two separate High Level Haulage Input Worksheets (i.e., one worksheet calculation for on-site and one for off-site).

Project Name: _____

Grading Activity/Phase: _____

User Inputs	
Input to use in URBEMIS	
Calculation (do not change)	

Cut/Fill Operations

Description	Amount	Units	Notes
Total Cut/Fill Volume	1,800	cubic yards	Enter information
Months of Activity	2	months	Enter information
Days of Activity	44	days	
Daily Cut/Fill Volume	40.91	cubic yards/day	

URBEMIS 2007 Ton-Mile Calculation

Description	Amount	Units	Notes
Soil Type	Loamy Coarse-Loamy		Use drop-down menu to select soil type. Assume Sandy unless project-specific soil type is known.
Soil Density	1.37	tons/cubic yard	Enter project specific soil density if known
Haul Distance (Round Trip On-Site)	0.04	miles	Enter distance
Ton-Mile per Day	2.25	ton-miles/day	

Notes:

On-site ton-mile assumes cut/fill volume is moved by scrapers.
Off-site ton-mile assumes cut/fill volume is moved by haul trucks.

Soil Density by Soil Type and Condition

Soil Type	Bulk Density (grams/cubic centimeter)	Density (pounds/cubic yard)	Density (tons/cubic yard)
Sandy	1.69	2,849	1.42
Loamy Coarse-Loamy	1.63	2,747	1.37
Loamy Fine-Loamy	1.60	2,697	1.35
Loamy Coarse-Silty	1.60	2,697	1.35
Loamy Fine-Silty	1.54	2,596	1.30
Clayey 25-25% clay	1.49	2,511	1.26
Clayey >45% clay	1.39	2,343	1.17

Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 2007. National Soil Survey Handbook, title 430-VI. [Online] Available at <<http://soils.usda.gov/technical/handbook/>>.



URBEMIS Construction Modeling Data Needs/Requests

1) Construction Schedule

Land use type and size to be developed

Commencement and buildout date

Duration and start date for each construction phase (e.g., demolition, grading, building construction)

Identify any potential or planned overlap in phases

Note: If project will be built out in multiple phases, provide information above for each phase.

2) Demolition

Commencement date and duration of activities

Total volume to be demolished

Maximum daily volume to be demolished

Haul truck capacity and distance to disposal site (URBEMIS defaults provided)

Demolition equipment required (URBEMIS defaults provided)

Note: URBEMIS estimates demolition construction equipment based on the land use being developed.

3) Grading (Mass and Fine)

Commencement date and duration of activities

Maximum daily acres disturbed (URBEMIS defaults provided)

Volume of material to be cut and/or filled (cubic yards)

Volume of material to be exported and/or exported (cubic yards)

Construction equipment required

Note: URBEMIS estimates grading construction equipment based on maximum daily acres disturbed.

4) Fugitive Dust

A) Method 1 (Default)

Maximum daily acres disturbed (URBEMIS defaults provided)

B) Method 2 (Low Level of Detail)

Duration of cut/fill operations

Volume of material to be cut and/or filled (cubic yards)

Origin of soil material (i.e., on-site or off-site)

C) Method 3 (Medium Level of Detail)

Duration of cut/fill operations

Number of scrapers or haul trucks operating per day

Hours of operation for each scraper or haul truck (scraper hours and haul truck hours)

D) Method 4 (High Level of Detail)

Duration of cut/fill operations

Volume of material to be cut and/or filled (cubic yards)

Bulk density of material (i.e., tons per cubic yard)

Round trip distance required to move materials on-site (on-site miles only)



5) Asphalt Paving

Commencement date and duration of activities

Total acres to be paved

Construction equipment required

Note: URBEMIS estimates asphalt paving construction equipment based on total acres to be paved.

6) Architectural Coatings

Commencement date and duration of activities



B. AIR QUALITY MODELING INSTRUCTIONS (URBEMIS)

This section provides detailed instructions for and examples of air quality modeling of operational and construction-related emissions pursuant to the methodological recommendations in this guide.

OPERATIONAL-RELATED EMISSIONS

URBEMIS Input Parameters

URBEMIS provides default values for Bay Area specific modeling parameters. Users may use the default values or provide project specific information when possible for more accurate emission quantification. BAAQMD-recommended input parameters and data requirements along with general URBEMIS user information for each operational-related activity are described below. Refer to the URBEMIS User's Guide and the BAAQMD Greenhouse Gas Model User's Manual (referred to collectively as the "User's Guide" below) for more detailed information.

Table B-1 URBEMIS Input Parameters for Operation Emissions	
Operational Input Parameters	Guidance Principle
Air District	Bay Area Air District
Analysis Year	Earliest possible year when project would be operational
Land Use Type and Units	Based on project description
Trip Rate	From project traffic study, local trip rates, or ITE Trip Generation Manual
Project Location	Urban
Road Dust	Category should not be turned off but can be modified if project information is known
Pass-by Trips	See User's Guide for further instructions
Double Counting Correction	See User's Guide for further instructions
Percentage of Land Uses using Natural Gas	100 percent for both residential and nonresidential development
Persons per Residential Unit (Consumer Products)	Based on estimated number of residents
All Other URBEMIS Inputs	Use default values, unless project-specific data is available. See User's Guide for further instructions ¹
¹ The rationale for changing default values should be disclosed in the CEQA document	

Land Use Type and Size

Choose each individual land use type (e.g., single family housing, apartment high rise, regional shopping center, or office park) that is most applicable to the proposed development project in the *Enter Land Use Data* module and enter the size of the project (e.g., acres, thousand square feet [ksf], students, dwelling units [du], rooms, pumps, rooms, or employees). Ensure that the unit type for the project-specific data is consistent with the unit type selected in URBEMIS. By default, URBEMIS estimates the trip generation rates for each land use type based on equations included in the ITE Trip Generation Manual. The trip rate represents the number of daily trips generated by a particular land use type by size. Override the default trip rate if project-specific data is available from the transportation analysis.



URBEMIS estimates the trip rate differently for residential land use types than for non-residential land use types. For residential land use types, URBEMIS adjusts the default trip rate based on residential density (i.e., dwelling units/residential acre). Overriding the default value for the number of acres for a residential land use type would automatically result in a change in the trip rate value. If both the number of acres and the trip rates for a residential development are known, enter the unit amount for the land use first, then adjust the acreage second, and then adjust the trip rate last. Select the *Submit* button after completing the *Enter Land Use Data* module.

For nonresidential land use types, URBEMIS uses a default trip rate value that is directly based on the unit amount entered into the *Enter Land Use Data* module. URBEMIS also assumes a Floor Area Ratio (FAR) of 0.5 for all nonresidential uses. The FAR is the ratio of the total floor area of a building to the size of the parcel on which it is located. Override the value in the acres data field based on the FAR for the proposed nonresidential land uses. URBEMIS does not adjust the default trip rate if the acre value is adjusted.

The *Enter Land Use Data* module includes a default worker commute trip percentage for all nonresidential land use types, which is used to estimate percentages of other commercial trip types in the *Enter Operational Data* module. The *Enter Land Use Data* module also contains default percentages of primary, diverted, and pass-by trips for all land use types, residential and non-residential. Primary trips are trips made for the specific purpose of visiting the generator and URBEMIS assumes that primary trips travel a full trip length; pass-by trips are trips made as intermediate stops on the way from an origin to another trip destination; and diverted-linked trips are trips attracted from the traffic volume on roadways in the vicinity of the generator but which require a diversion from that roadway to another roadway to gain access to the site. Pass-by and diverted-linked trips are assigned a shorter trip distance than primary trips. URBEMIS assumes that pass-by trips result in virtually no extra travel, with an assumed trip length of 0.1 mile. Diverted-linked trip lengths are assumed to equal 25 percent of the primary trip length. URBEMIS allows users to edit these data fields. URBEMIS incorporates this information for estimation of mobile-source emissions only if the check box for the Pass-by Trips category in the *Enter Operational Data* module is selected. When not selected, URBEMIS assumes all trips are primary trips. BAAQMD recommends reviewing the User's Guide for more information about when to use this feature. Additional discussion about pass-by trips is provided under the *Enter Operational Data* module guidance below.

When estimating emissions for a type of land use that is not listed in URBEMIS, select a similar land use type or add a new land use type on the Blank tab of the *Enter Land Use Data* module. When selecting a similar nonresidential land use type as a proxy, consider the worker commute trip percentage and the primary, diverted, and pass-by trip values. The name of the land use type is unimportant and can be overridden with new text if desired. BAAQMD recommends using one of the types of residential land uses listed in URBEMIS as a proxy when analyzing any type of unique residential project.

For unique nonresidential types of land uses, BAAQMD recommends either using another nonresidential land use type as a proxy or using a Blank land use type. If a new land use type is analyzed using a row on the Blank tab of the *Enter Land Use Data* module, enter a trip rate as URBEMIS does not provide default trip rate on the Blank tab. BAAQMD recommends using a trip rate from the [ITE Trip Generation Manual](#), if an appropriate trip rate is available. If an applicable trip generation rate is not available, the Lead Agency should make a good faith effort to derive a trip generation rate for the proposed project.

Operational Data

The *Enter Operational Data* module allows users to estimate vehicle exhaust emissions from trips (and associated VMT) generated by a project. The module consists of seven operational



parameter categories including *Year & Vehicle Fleet*, *Trip Characteristics*, *Temperature Data*, *Variable Starts*, *Road Dust*, *Pass-by Trips*, and *Double-Counting Correction*. The first five operational categories are all needed to calculate vehicle exhaust emissions and; therefore, cannot be turned off. Three of the seven operational categories can be turned off: *Road Dust*, *Pass-by Trips*, and *Double-Counting Correction*.

Guidance regarding each of the operational categories is provided below. In general, most of the default values for these seven source categories do not need to be changed, except where otherwise noted.

Year & Vehicle Fleet

The *Year & Vehicle Fleet* category allows users to specify the operational year for the project. Use the earliest possible year when the project would be operational to estimate worst-case operational emissions. Be aware that changing the project start year also changes the vehicle fleet mix. The default fleet mix values (i.e., *Fleet %*, *Vehicle Type*, *Non-Catalyst*, *Catalyst*, *Diesel*) are based on values from EMFAC using the year and the location of the project that is specified when users creates a new project in URBEMIS. The fleet mix should be modified only if it is known that the fleet mix for a project would be different from the average vehicle fleet mix in the project area. In that situation, select *Keep Current Fleet Mix When Changing Years*. Changes to the fleet mix data should be based on information provided by the transportation analysis and/or assumptions that are disclosed in the CEQA document. For instance, the fleet mix of motor vehicle trips generated by a school project would likely consist of a higher percentage of school buses and a lower percentage of motor homes and motorcycles than the URBEMIS average.

Trip Characteristics

The *Trip Characteristics* category includes trip data such as average speed, trip percentages, urban and rural trip lengths for different trip types. The trip percentages for home-based trips can be modified; however, it is not possible to modify the same for commercial-based trips, which URBEMIS calculates using the worker commute trip percentage entered in the *Enter Land Use Data* module. URBEMIS uses either the urban or rural trip length values depending on whether *Urban Project* or *Rural Project* is selected on the same screen. In general, the *Urban Project* option should be selected for most land use development projects under BAAQMD's jurisdiction. The trip length values can be changed if supported by information produced in a transportation analysis and/or reasonable assumptions about the project. For instance, the trip length for a proposed school might be adjusted according to the spatial distribution of the households that would be served by that school, particularly if the majority of trip generation would consist of parents driving their children to the school.

In addition to trip rate adjustments based on residential density, URBEMIS allows for modifications to vehicle trips based on other project characteristics. If specific project information is available for any land use type it should be reflected in the URBEMIS inputs. The table "URBEMIS Measures – Operational (Mobile-source) Measures" in Section 4.2 lists available measures to alter the trip rate to better reflect specific conditions. For example, if a project includes access to transit, URBEMIS trip rates can be adjusted between 0% and 15%. A 15% reduction in vehicle trips due to transit access would only be appropriate for a project that offers access to exceptional transit service. See the User's Guide for further instructions on all adjustments. Lead agencies must discuss and justify their reductions with substantial evidence.

Temperature Data

The *Temperature Data* category contains default ambient winter and summer temperature values which are used to estimate winter and summer emissions, respectively. The default temperature values in these data fields are specific to SFBAAB and should only be modified in consultation with BAAQMD.



Variable Starts

The *Variable Starts* parameter category shows the percentage of vehicles in several time classes (minutes since the vehicle engine was turned off) for the six trip types defined in the *Trip Characteristics* parameter category. This information is derived from the applicable EMFAC file and should only be modified in consultation BAAQMD.

Road Dust

The *Road Dust* parameter category allows users to specify the distribution of vehicle travel between paved and unpaved roads. This category is used to calculate entrained road dust emissions due to vehicle travel on paved and unpaved surfaces. Do not turn this category off, and users can adjust the percentage of travel on paved and unpaved roads if detailed project information is known.

Pass-by Trips

The *Pass-by Trips* parameter category can only be turned on or off. When selected, this category divides all the project-generated trips into primary, pass-by, and diverted-linked trips (entered as percentages in *Enter Land Use Data* module). When this category is not selected, URBEMIS assumes 100 percent of the project-generated trips are primary trips. Pass-by trips are trips made as intermediate stops on the way from an origin to a primary trip destination. URBEMIS accounts for these trips by setting the trip length to 0.1 miles for each pass-by trip. These trips are most important for retail and commercial land uses, such as gas stations and fast food restaurants. This option is not applicable to all land use types. For example, most of the trips to and from a *Warehouse* are typically expected to be primary trips and the *Pass-by Trips* option should not be used. This category check box should not be selected unless the percentage of pass-by trips is supported by a transportation analysis or a set of reasonable assumptions discussed in the CEQA document. If the trip length values in the *Trip Characteristics* category or the trip rate values in the *Enter Land Use Data* module are overwritten using information provided by a transportation analysis, be aware of whether the traffic data incorporated the occurrence of pass-by trips. If the *Pass-By Trips* checkbox is selected then the Lead Agency should discuss its reasoning for assuming that some of the project-generated vehicle trips would be considered pass-by trips.

Double-Counting Correction

The *Double-Counting Correction* parameter category is designed to account for internal trips between residential and nonresidential land uses. The *Double-Counting Correction* is applicable to mixed-use projects that include both residential and nonresidential land use types in the *Enter Land Use Data* module. For example, a residential trip and a retail trip generated by a mixed-use project may be the same trip. Users have the option of entering the number of internal trips between residential and nonresidential land uses in the *Enter the gross internal trip* as desired. The value entered represents the number of internal trips that would not be included in the emissions estimate. This category should not be used unless the transportation analysis or local transportation studies contain data to support the correction factor. In some cases, the transportation analysis may report project-specific trip generation that is already corrected for internal trips. Consult with a traffic engineer to determine the appropriate method to account for internal trips. The *Double-Counting Correction* checkbox should not be selected if detailed project information is unknown.

Area Source

The *Enter Area Source Data* module allows users to adjust the five area-source emission categories including, natural gas fuel combustion, hearth fuel combustion, landscape fuel combustion, consumer products, and architectural coatings. The natural gas, hearth, and landscape maintenance categories relate to on-site fuel combustion and the consumer products and architectural coatings categories address on-site evaporative emissions.



Guidance regarding each of the area-source categories is provided below. In general, most of the default values for these five source categories do not need to be changed except where otherwise noted in this guide.

Natural Gas Fuel Combustion

Parameters in the *Natural Gas Fuel Combustion* category are used to estimate the natural gas combustion emissions from space and water heating. On the *Natural Gas* tab the default percentage for land uses using natural gas should be changed to 100 percent for both residential and nonresidential land use types, as is representative of most development projects in the SFBAAB, unless project-specific data is available. Similarly, do not override the default natural gas usage values unless project-specific data is available.

Hearth Fuel Combustion

The *Hearth Fuel Combustion* category consists of separate tabs for *Hearth Percentages*, *Wood Stoves*, *Wood Fireplaces*, *Natural Gas Fireplaces*, and *Natural Gas Emission Factors*. Each of the tabs is discussed separately below.

- *Hearth Percentages*

The parameters on the *Hearth Percentages* tab are applicable only to projects that include residential units. The default percentages should be used for the wood stoves, wood fireplaces, and wood stoves unless project-specific information is available. URBEMIS does not estimate emissions from any hearth types for nonresidential land use types.

- *Wood Stoves*

On the *Wood Stoves* tab, the default percent values for the types of wood stoves (i.e., *Noncatalytic*, *Catalytic*, *Conventional*, and *Pellet*) should be changed in accordance with [District Regulation 6, Rule 3](#), which allows only EPA-certified wood burning fireplaces and pellet stoves in new construction projects. The values for *Wood Burned*, *Wood Stove Usage*, and *Pounds in a Cord of Wood* should not be changed unless project-specific information is available.

- *Wood Fireplaces*

The *Wood Fireplaces* tab is similar to the *Wood Stoves* tab. The emission factors on this tab cannot be modified. The values for *Wood Burned*, *Wood Stove Usage*, and *Pounds in a Cord of Wood* should not be changed unless project-specific information is available. [District Regulation 6, Rule 3](#) allows only EPA-certified wood burning fireplaces in new construction projects.

- *Natural Gas Fireplaces*

The values in the data fields on the *Natural Gas Fireplaces* tab should only be modified in the case that project-specific information is available that supports overriding default values.

- *Natural Gas Emission Factors*

The emission factors contained in the *Natural Gas Emission Factors* tab cannot be modified. These values are used to estimate emissions from natural gas combustion in fireplaces/stoves and, according to the [URBEMIS User's Guide](#), are based on [U.S. Environmental Protection Agency Air Pollutant \(AP-42\) emission factors](#).

Landscape Fuel Combustion

The *Landscape Fuel Combustion* source category calculates on-site emissions from landscaping equipment such as lawn mowers, leaf blowers, chain saws, and hedge trimmers that are powered by internal combustion engines. On this tab, only adjust the value for the year being analyzed. The year entered into this field should be the earliest year when the project could become fully



operational. Landscaping emissions are estimated for the summer period only. URBEMIS uses emission rates from ARB's OFFROAD model to estimate of landscape maintenance equipment emissions.

Consumer Products

The *Consumer Products* source category is only relevant to projects that include residential land use types. The *Pounds of ROG (per person)* value should not be adjusted in this category. The persons per residential unit data field should be adjusted based on the estimated number of residents that would be supported by the proposed project, if available. The value should be consistent with the number of residents divided by the number of residential units.

Architectural Coating

Do not make changes to the values in the *Architectural Coating* source category without consulting BAAQMD.

EXAMPLE PROJECT OPERATIONAL-RELATED EMISSIONS CALCULATION

Description

The Example Project would develop a multi-story, mixed-use building that includes 40 units of residential condominium apartments, 50,000 square feet (or "50 thousand square feet" [ksf]) of offices and 35 ksf of retail land uses on an undeveloped 4.0-acre site. All of the residential condominium apartments would have natural gas lines for space heating but half of the units would be referred to as "suites" and include natural gas fireplaces. The regular apartments would not have natural gas fireplaces. Project construction would last two years beginning in 2010 and the project would be fully operational by 2013.

Screening Analysis

In the Land Use Module of URBEMIS (*Enter Land Use Data*) the corresponding Land Use Types of the proposed development would be Apartment High Rise units, General Office Building, and Strip Mall.

When each of the Land Use Types (i.e. Apartment High Rise units, General Office Building, and Strip Mall) is considered individually, their respective sizes would not exceed any of the District's Operational Screening Criteria (Table 3-1). However, because the project would contain more than one land use type, the operational screening levels cannot be used to assess the project's operational emissions, as explained in the discussion about the screening levels earlier in this guidance. The lead agency would be required to perform a detailed estimation of operational emissions using URBEMIS.

Emissions Quantification

When entering the proposed land uses into the Land Use Module, URBEMIS estimates the number of Acres for each Land Use Type assuming that each land use type would be constructed on separate lots. Using default values URBEMIS would assume this Example Project is 4.56 total acres (i.e. 0.65 acres for Apartment High Rise, 2.30 acres for General Office Building, and 1.61 acres for Strip Mall). For mixed-use and/or multi-level developments, the user should adjust the Acres for each of the proposed land uses such that the combined total acreage of all land use types is equal to the actual combined total size of the proposed project site (i.e., 4.0 acres, in this example) prior to running the model.

URBEMIS estimates the Trip Rate differently for residential land use types than for non-residential land use types. For residential land use types, URBEMIS adjusts the default Trip Rate based on residential density (i.e., dwelling units/residential acre). Therefore, overriding the default



value for the number of Acres assumed by URBEMIS for a residential land use type would automatically result in a change to the value assumed in the Trip Rate data field. If both the number of Acres and the Trip Rate for a residential development are known, the user should adjust the Acres field first, then adjust the Trip Rate field, and then click the Submit button. For nonresidential Land Use Types, URBEMIS uses a default value for in the Trip Rate data field that is directly based on the Unit Amt entered into the Land Use Module. The trip rates used by URBEMIS are based on standard rates from the ITE Trip Generation Manual. URBEMIS also assumes a Floor Area Ratio (FAR) of 0.5 for all nonresidential land use types. The FAR is the ratio of the total floor area of a building to the size of the parcel on which it is located. The user should override the value in the Acres data field based on the actual FAR for the development, as appropriate.

In the Area Source Module, Hearth Fuel Combustion category, the user should change the data fields for Wood Stoves, Wood Fireplaces, Natural Gas Fireplaces, and None (% w/o any hearth option) on the Hearth Percentages tab to 0, 0, 50, and 50, respectively to match the project description. In the Landscape Fuel Combustion source category the Year being Analyzed data field should be changed to 2013.

In the Operational Module the year data field in the Year & Vehicle Fleet category page should also be changed to 2013.

Lastly, the estimated daily and annual emissions of criteria air pollutants and precursors should be compared to the District's thresholds of significance (Table 2-2). If the daily or annual emissions would exceed the thresholds of significance, operational emissions would be considered significant and all feasible mitigation measures should be implemented to reduce these emissions.

CONSTRUCTION-RELATED EMISSIONS

Land Use Development Projects

URBEMIS includes a module (*Enter Construction Data*) that quantifies emissions from the following construction-related activity phases: demolition, mass and fine grading ("grading"), trenching, asphalt paving, building construction, and the application of architectural coatings.

URBEMIS Input Parameters

BAAQMD recommends input parameters and data requirements along with general URBEMIS user information for each construction-related activity phase below. Refer to the URBEMIS User's Manual for more detailed information. Appendix A contains a *Construction Data Needs Form* template that can be used to assist with requesting and gathering project-specific information.

Land Use Type and Size

Choose each individual land use type (e.g., single family housing, apartment high rise, regional shopping center, or office park) that is most applicable to the proposed development project in the *Enter Land Use Data* module and enter the size of the project (e.g., acres, thousand square feet [ksf], students, dwelling units [du], rooms, pumps, rooms, or employees). For several of the land use types, various size units are available (e.g., ksf and acres); ensure that the unit type for the project-specific data is consistent with the unit type selected in URBEMIS.

Schedule

The project schedule typically provides the number of months or days required for the completion of each construction-related activity phase (e.g., grading, building construction, asphalt paving), as well as the total duration of project construction. Where project-specific information is



available, modify URBEMIS default assumptions in *Click to Add, Delete, or Modify Phases* under the *Enter Construction Data* module. In this module, add or delete construction activities, add multiple similar construction activities (e.g., three grading phases), as well as overlap any construction activities as necessary. The URBEMIS default assumption for the number of work days per week is five, which inherently assumes that construction-related activities would only occur during weekdays, not on weekends. This can be altered if project-specific data is available in *Click to Add, Delete, or Modify Phases* under the construction phase setting *Work Days/Week*. For projects with specific phasing information (i.e., duration of each construction phase), but no definite construction commencement date, the earliest feasible start date should be used to be conservative. In addition, when project-specific information is not known, assume some overlap of construction phases (e.g., overlap of grading and asphalt paving activities or asphalt paving and building construction activities) to also be conservative. Please note that URBEMIS quantifies annual emissions on a calendar year basis (i.e., January to December) rather than the year-long period (running yearly average from the start date of construction) with the maximum amount of emissions.

Demolition

URBEMIS quantifies exhaust and fugitive PM dust emissions from demolition activities in the *Demolition Phase* within the *Enter Construction Data* module. Information to quantify emissions from this activity phase includes:

1. Duration of demolition (work days/week, phase start and end dates);
2. Total volume of building to be demolished (width, length, and height);
3. Maximum daily volume of building to be demolished (width, length, and height);
4. Haul truck capacity (cubic yards [yd³]);
5. Haul truck trip length to disposal site (round trip miles); and
6. Off-road equipment requirements (number and type of equipment).

URBEMIS contains default assumptions for haul truck capacity (yd³ per truck) and round trip distance (miles), if project-specific information is not available. URBEMIS also contains default assumptions for off-road equipment requirements. URBEMIS bases these on the size(s) of the proposed land use type(s) in the *Enter Land Use Data* module to estimate the off-road equipment requirements. In other words, URBEMIS assumes the size of the land use to be demolished is equal to the land use that would be developed. If the size(s) and/or type(s) of the land use(s) to be demolished are different from the land use(s) to be developed, create a separate URBEMIS run to quantify demolition emissions. Input the size and type of land use(s) for the different demolition building space versus the proposed building space in the *Enter Land Use Data* module for the separate URBEMIS run and only include the *Demolition* phase within the *Enter Construction Data* module.

Site Grading (Mass and Fine)

URBEMIS quantifies exhaust and fugitive PM dust emissions from grading activities in the *Site Grading* phase within the *Enter Construction Data* module. Information to quantify emissions from this activity phase includes, where applicable:

1. Duration of grading (work days/week, phase start and end dates);
2. Total acreage to be graded (acres);
3. Maximum daily acreage disturbed (acres per day);
4. Type and amount of cut/fill activities (yd³ per day on- or off-site);
5. Description of soil hauling (amount of soil import/export [yd³], haul truck capacity [yd³ per truck], round trips per day, round trip distance [miles]); and



6. Off-road grading equipment requirements (number and type of equipment).

URBEMIS default assumptions for the total acreage to be graded and the maximum daily acreage disturbed are shown in the *Daily Acreage* tab within the *Site Grading* phase. Under the default settings, URBEMIS assumes that the maximum daily acreage disturbed is equivalent to 25 percent of the total acreage to be graded. Override this default assumption if more specific project information is available. The *Site Grading* phase consists of separate tabs for *Daily Acreage*, as mentioned above, *Fugitive Dust*, *Soil Hauling*, and *Site Grading Equipment*. Due to the differences in methodology and level of information required, each is discussed separately below.

Fugitive Dust

URBEMIS quantifies fugitive PM dust emissions in the *Site Grading* phase under the *Fugitive Dust* tab. URBEMIS provides four different levels of detail from which to select (i.e., default, low, medium, and high), described below.

Default: This method involves the use of the *Default Emission Rate* quantification methodology in the *Fugitive Dust* tab for which fugitive PM dust emissions are based on an emission rate (pound per disturbed acre per day [lb/acre-day]). This method should only be used when no project-specific information is known, or when no cut/fill activities would occur. BAAQMD recommends the selection of the worst-case emission rate (i.e., 38.2 lb/acre-day) for extensive site preparation activities (e.g., cut/fill) where the exact type and amount (e.g., yd³ per day on- or off-site) are not known, and selection of the average emission rate (i.e., 10 lb/acre-day) otherwise. The average emission rate would be used for projects that involve typical site grading activities, but no cut/fill or earthmoving activities.

Low: The *Low Level of Detail* quantification method should be used when cut/fill activities would occur and the amount of on-site and off-site cut/fill is known. Input the type and amount of cut/fill activities (yd³ per day on- or off-site). On-site cut/fill activities involve soil movement within the boundaries of the project site via scrapers or graders, while off-site cut/fill activities involve soil movement outside of the boundaries of the project site via haul trucks. Projects that require off-site cut/fill should also enter the appropriate amount of soil import/export in the *Soil Hauling* tab, as discussed in more detail below.

Medium: The *Medium Level of Detail* quantification method should be used when cut/fill activities would occur and the required number of activity hours per day for on-site scrapers and off-site haul trucks is known. Input the number of hours per day for on-site scraper and off-site haul trucks conducting cut/fill activities. Input the total number of scraper-hours and/or haul truck-hours that are anticipated to occur per day. For example, if two scrapers would operate for eight hours per day each and three haul trucks would operate for four hours per day each, enter 16 for the *Onsite Scraper* parameter (i.e., 2 scrapers × 8 hours) and 12 for the *Offsite Haul* parameter (i.e., 3 haul trucks × 4 hours). Similar to the *Low Level of Detail* quantification method, on-site cut/fill activities involve soil movement within the boundaries of the project site via scrapers or graders, while off-site cut/fill activities involve soil movement outside of the boundaries of the project site via haul trucks. Projects that require off-site cut/fill should also enter the appropriate amount of soil import/export in the *Soil Hauling* tab, as discussed in more detail below.

High: The *High Level of Detail* quantification method should be used when cut/fill activities would occur and details about soil haulage is known. Input data on the amount of on- and off-site haulage (ton-miles per day) based on the total volume of cut/fill (yd³), duration of the cut/fill activities (work days), density of soil being moved (tons per yd³), and the scraper or haul truck round-trip distance (miles). A *High Level Haulage Input* worksheet that can be used to assist with



determining the amount of on- and off-site haulage (ton-miles per day) required for this method is contained in Appendix A.

Soil Hauling

URBEMIS quantifies entrained PM road dust and exhaust emissions from soil hauling in the *Soil Hauling* tab within the *Site Grading* phase. Information requirements include the amount of soil import/export (yd³), round trips per day, round trip distance (miles), and haul truck capacity (yd³ per truck). For round trip distance and haul truck capacity, URBEMIS provides default assumptions of 20 yd³ per truck and 20 miles, respectively. Override the default assumptions if the project specific values are known.

Grading Equipment

URBEMIS quantifies exhaust emissions from on-site heavy-duty equipment in the *Site Grading Equipment* tab within the *Site Grading* phase. Information requirements include the type of equipment and quantity or amount, along with horsepower, load factor, and hours of operation per work day. URBEMIS provides default assumptions for all of these, primarily based on the amount of maximum daily acreage disturbed shown in the *Daily Acreage* tab. If project-specific grading equipment is known, click on the *All Checks Off* button and input the number for each type of equipment to be used for the project. Note that although the *All Checks Off* button will allow users to override the URBEMIS default equipment assumptions in the *Amount Model Uses* column, make sure to delete the previous URBEMIS default equipment selections prior to entering the project-specific equipment information.

Asphalt Paving

URBEMIS quantifies off-gas and exhaust emissions from asphalt paving activities in the *Paving* tab within the *Enter Construction Data* module. Information to quantify emissions from this activity phase includes the duration of asphalt paving (work days/week, phase start and end dates), total acreage to be paved, and off-road equipment requirements. URBEMIS includes default assumptions for the amount of asphalt to be paved based on the size of the proposed land use type(s) in the *Enter Land Use Data* module. Account for the size of project features (e.g., parking structure, roadways, and large hardtop fields) that would require asphalt paving in excess of default assumptions (i.e., standard site access and parking spaces) within the *Total Acreage to be Paved with Asphalt* parameter.

Architectural Coating

URBEMIS quantifies off-gas emissions from the application of architectural coatings in the *Arch Coating* tab within the *Enter Construction Data* module. Information to quantify emissions from this phase include the duration of activities (i.e., work days/week, phase start and end dates). URBEMIS includes default parameters for the volatile organic compound content per liter of coating based on BAAQMD's Regulation 8, Rule 3: Architectural Coating.

Basic Construction Mitigation Measures

BAAQMD recommends that all proposed projects implement the *Basic Construction Mitigation Measures* regardless of the significance determination. The methodology for quantifying criteria air pollutant and precursor emission reductions from both fugitive PM dust and exhaust emissions by implementing the *Basic Construction Mitigation Measures* discussed below.

Fugitive Particulate Matter Dust Emissions

For quantification of fugitive PM dust-related *Basic Construction Mitigation Measures* in URBEMIS, BAAQMD first recommends selecting the *Mitigation* option in the *Enter Construction Data* module for the *Site Grading* phase. For *Site Grading Soil Disturbance Mitigation*, select (turn on) the soil stabilizing measure titled *Water exposed surfaces* along with the two times daily option without altering the default percent reduction. For *Unpaved Roads Mitigation*, select the



measure titled *Reduce speed on unpaved roads to less than 15 mph* without altering the default percent reduction. URBEMIS assumes that fugitive PM dust emissions from soil disturbance activities and travel on unpaved roads account for approximately 79 percent and 21 percent of total the fugitive PM dust emissions, respectively. URBEMIS will apply an approximate 53 percent reduction to total fugitive PM dust emissions as a result of implementation of the *Basic Construction Mitigation Measures* 1 through 5 in Table 8-2.

BAAQMD considers this as a surrogate for the implementation of the *Basic Construction Mitigation Measures* listed in Section 8.2. RoadMod assumes an inherent 50 percent reduction in fugitive PM dust emissions when water trucks are selected. BAAQMD recommends selecting water trucks to account for the implementation of the *Basic Construction Mitigation Measures*.

Exhaust Emissions

For quantification of the exhaust-related *Basic Construction Mitigation Measures* in URBEMIS, select the *Mitigation* option in the *Enter Construction Data* module for the *Site Grading*, *Building Construction*, and *Asphalt Paving* phases, as applicable to the proposed project. BAAQMD then recommends that for the *Off-Road Equipment Mitigation*, select (turn on) the measure titled *Use aqueous diesel fuel* and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Basic Construction Mitigation Measures* listed in Section 8.2.

RoadMod

RoadMod does not calculate emission reductions associated with the implementation of the exhaust-related *Basic Construction Mitigation Measures*. To quantify the exhaust-related emission reductions associated with the implementation of the *Basic Construction Mitigation Measures*, rely on the information and data contained in the *Data Entry* and *Emission Estimates* tabs in RoadMod. Reductions in exhaust emissions should be quantified separately for each phase (i.e., Grubbing/Land Clearing, Grading/Excavation, Drainage/Utilities/ Sub-Grade, and Paving). First isolate the exhaust emissions from off-road (e.g., heavy-duty) equipment for each phase. Table 8-4 below provides a cell reference for the *Data Entry* tab of RoadMod to assist with the identification and isolation of such emissions.

Once isolated, apply the specified percent reductions listed in Section 8.2 to each compound emission to determine the resultant amount of mitigated emissions from construction of the proposed project for each phase. A 5 percent reduction could be applied for NO_x, PM₁₀, and PM_{2.5} to account for implementation of the appropriate *Basic Construction Mitigation Measures*.

Emission reductions should be estimated by multiplying the total emissions for each compound by the anticipated emission reduction applicable for that compound to estimate the mitigated amount of emissions reductions.

Linear Projects

For proposed projects that are linear in nature (e.g., road or levee construction, pipeline installation, transmission lines), BAAQMD recommends using the most current version of Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model ([RoadMod](#)) to quantify construction-related criteria air pollutants and precursors. Similar to URBEMIS, RoadMod quantifies fugitive PM dust, exhaust, and off-gas emissions from the following construction-related activity phases: grubbing/land clearing, grading/excavation, drainage/utilities/sub-grade, and paving. BAAQMD recommends using RoadMod in accordance with the user instructions and default assumptions unless project-specific information is available. The default assumptions are applicable to projects located within the SFBAAB. Also, URBEMIS inherently accounts for the on-site construction of roadways and the installation of project infrastructure. If the proposed project involves off-site improvements that



are linear in nature (e.g., roadway widening), use RoadMod in addition to URBEMIS to determine total emissions.

Linear Construction Phase	NO _x	PM ₁₀	PM _{2.5}
Grubbing/Land Clearing	G155	H155	I155
Grading/Excavation	G195	H195	I195
Drainage/Utilities/Sub-Grade	G235	H235	I235
Paving	G275	H275	I275

Notes: NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less.
 Cell references refer to the *Data Entry* tab from the SMAQMD Road Construction Emissions Model.
 Source: SMAQMD 2009.

NO_x Emission Reduction

Emissions of NO_x (lb/day) × (1 – [NO_x percent reduction])

PM₁₀ Emission Reduction

Emissions of PM₁₀ (lb/day) × (1 – [PM₁₀ percent reduction])

PM_{2.5} Emission Reduction

Emissions of PM_{2.5} (lb/day) × (1 – [PM_{2.5} percent reduction])

Users should use the *Emission Estimates* tab to calculate the total mitigated amount of emissions for each phase of construction. The total NO_x, PM₁₀, and PM_{2.5} exhaust emissions for each phase are contained in cells E6 to E9, H6 to H9, and K6 to K9, respectively. To calculate the total amount of mitigated emissions, first subtract the unmitigated off-road equipment exhaust emissions (Please refer to Table 8-2) from the total exhaust emissions to calculate total emissions without inclusion of off-road equipment exhaust emissions. Then, add the mitigated off-road exhaust emissions (calculated with the method described above) to the remaining emissions to calculate the total emissions with mitigated off-road construction equipment exhaust emissions. For PM₁₀ and PM_{2.5}, add the mitigated exhaust emissions with the mitigated fugitive PM dust emissions (calculated by RoadMod) to calculate the total amount of mitigated PM₁₀ and PM_{2.5} emissions.

Fugitive Particulate Matter Dust

BAAQMD recommends that for *Site Grading Soil Disturbance Mitigation* select (turn on) the soil stabilizing measure titled *Equipment loading/unloading*. To account for the implementation of the *Additional Construction Mitigation Measures 1 through 8*, alter the default percent reduction to 63 percent, which would result in a total reduction of 75 percent in fugitive PM dust emissions.

To quantify emission reductions associated with the implementation of the fugitive PM dust-related *Additional Construction Mitigation Measures* in RoadMod, rely on the *Emission Estimates* tab. RoadMod assumes a 50 percent reduction in fugitive PM dust emissions. Apply an additional 50 percent reduction to the fugitive PM dust emissions contained in the *Emission Estimates* tab of RoadMod to account for the implementation of the *Additional Construction Mitigation Measures 1 through 8*. The resulting total percent reduction from fugitive PM dust emissions would be 75



percent (i.e., $1 - (0.5 \times 0.5)$). The resultant amount of fugitive PM dust emissions should be added to the average daily mitigated exhaust PM emissions (methodology described below) to calculate the total amount of mitigated PM₁₀ and PM_{2.5} emissions.

Exhaust Emissions

BAAQMD recommends that for the *Off-Road Equipment Mitigation* select (turn on) the measure titled *Diesel particulate filter* and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Additional Construction Mitigation Measures*. BAAQMD recommends that, if implementing Measure 9, turn on the measure titled *Use aqueous diesel fuel* and alter the default percent reduction values to 20 percent for NO_x and 45 percent for PM₁₀, and PM_{2.5}.

For RoadMod, apply a 20 percent reduction for NO_x and a 45 percent reduction for PM₁₀ and PM_{2.5} to account for implementation of Measure 9 in the *Additional Construction Mitigation Measure*. To quantify the other exhaust-related emission reductions associated with the implementation of the *Additional Construction Mitigation Measures*, follow the same methodology described above for applying the reductions associated with the implementation of the *Basic Construction Mitigation Measures*.

Off-Gas Emissions

For quantification of off-gas-related *Additional Construction Mitigation Measures*, first select the *Mitigation* option in the *Enter Construction Data* module for the *Architectural Coating* phase. Then select (turn on) the measures applicable to the proposed project and alter the default percent reduction for each to match those recommended by BAAQMD in Section 8.2. BAAQMD considers this as a surrogate for the implementation of the *Additional Construction Mitigation Measures* listed in Section 8.2.

EXAMPLE PROJECT CONSTRUCTION-RELATED EMISSIONS CALCULATION

Description

This Example Project proposes development of 100 single-family residential units over a 2-year period. The project site would be approximately 33 acres (URBEMIS default assumption) and require an undetermined volume of fill materials to be imported to the site. In addition, the project would involve construction of a new access road to serve the development.

Screening Analysis

The project size is less than the construction screening level for single-family residential uses listed in Table 3-4. However, because the project includes the import of fill to the site, the construction screening levels cannot be used to address construction emissions. Therefore, a detailed quantitative analysis of construction-generated NO_x emissions should be performed using URBEMIS to estimate NO_x generated by construction of the residential units and using the RoadMod to estimate NO_x emissions from construction of the new access road.

Emissions Quantification

The size and type of land use proposed (i.e., single family housing) should be entered into the Land Use Module in URBEMIS. In this case, the project's total acres are equal to the default URBEMIS assumption; therefore, no override is necessary in the Acres data field. Modeling the construction emissions associated with single-family residential units in URBEMIS requires detailed information about the construction schedule (e.g., commencement date, types of construction activities required, and length of construction activities).



The fugitive PM dust emissions associated with fill activities should be estimated using the Fugitive Dust tab of the Mass Site Grading phase. For use of the Low Level of Detail quantification method, the volume of fill activities should be divided by the number of days that fill activities would occur. For example, if the project would require up to 20,000 yd³ of fill materials to be imported over a minimum of 40 work days, the user should enter 500 (i.e., 20,000 yd³ ÷ 40 days) into the Amount of Offsite Cut/Fill (cubic yards/day) data field. In addition, users should also input the total volume of fill materials to be imported into the Total Amount of Soil to Import (cubic yards) data field in the Soil Hauling tab. Off-road construction equipment for grading activities is estimated by URBEMIS based on the Maximum Daily Acreage Disturbed data field.

URBEMIS estimates the types and quantities of construction equipment in the Building Construction phase to develop the proposed project. For the Asphalt Paving phase, URBEMIS assumes the project requires asphalt paving for 25% of the total site. If more specific information can be provided, then user should turn off the Reset acreage with land use changes button in the Off Gas Emissions tab and override the Total Acreage to be Paved with Asphalt data field.

Due to the linear nature of the new access road to the project, daily mass emissions associated with its construction should be quantified using RoadMod. Users should obtain basic project information for the new access road and enter the information into the Data Entry tab of RoadMod. If project-specific information is not available RoadMod estimates the construction schedule for the road and the equipment used in each construction phase.

For analysis of the project's total average daily emissions, users should add emissions of each respective pollutant associated with development of the single-family residential units with the respective emissions associated with construction of the access road where construction activities are anticipated to overlap in the construction schedule. The average daily emissions of each pollutant that would occur throughout the entire construction period should be identified and compared with the District's threshold of significance. If the emissions would exceed the threshold of significance, construction emissions would be considered significant and all feasible mitigation measures to reduce emissions shall be implemented.

The user should keep in mind that the District's numeric thresholds for construction emissions apply to exhaust emissions only. The District recommends implementation of Basic Control Measures to reduce fugitive dust emissions for all projects, and Additional Control Measures to reduce fugitive dust emissions for significant projects.



C. SAMPLE AIR QUALITY SETTING

The Bay Area Air Quality Management District (BAAQMD) is the regional air quality agency for the San Francisco Bay Area Air Basin (SFBAAB), which comprises all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, the southern portion of Sonoma, and the southwestern portion of Solano County. Air quality in this area is determined by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. These factors along with applicable regulations are discussed below.

C.1.1. Climate, Topography, Air Pollution Potential

The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The Coast Range splits resulting in a western coast gap, Golden Gate, and an eastern coast gap, Carquinez Strait, which allow air to flow in and out of the SFBAAB and the Central Valley.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface because of the northwesterly flow produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band resulting in condensation and the presence of fog and stratus clouds along the Northern California coast.

In the winter, the Pacific high-pressure cell weakens and shifts southward resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential.

High Pressure Cell

During the summer, the large-scale meteorological condition that dominates the West Coast is a semi-permanent high pressure cell centered over the northeastern Pacific Ocean. This high pressure cell keeps storms from affecting the California coast. Hence, the SFBAAB experiences little precipitation in the summer months. Winds tend to blow on shore out of the north/northwest.

The steady northwesterly flow induces upwelling of cold water from below. This upwelling produces a band of cold water off the California coast. When air approaches the California coast, already cool and moisture-laden from its long journey over the Pacific, it is further cooled as it crosses this bank of cold water. This cooling often produces condensation resulting in a high incidence of fog and stratus clouds along the Northern California coast in the summer.

Generally in the winter, the Pacific high weakens and shifts southward, winds tend to flow offshore, upwelling ceases and storms occur. During the winter rainy periods, inversions (layers of warmer air over colder air; see below) are weak or nonexistent, winds are usually moderate and air pollution potential is low. The Pacific high does periodically become dominant, bringing strong inversions, light winds and high pollution potential.

Topography

The topography of the SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys and bays. This complex terrain, especially the higher elevations, distorts the normal wind flow patterns in the SFBAAB. The greatest distortion occur when low-level inversions are present and the air beneath the inversion flows independently of air above the inversion, a condition that is common in the summer time.



The only major break in California's Coast Range occurs in the SFBAAB. Here the Coast Range splits into western and eastern ranges. Between the two ranges lies San Francisco Bay. The gap in the western coast range is known as the Golden Gate, and the gap in the eastern coast range is the Carquinez Strait. These gaps allow air to pass into and out of the SFBAAB and the Central Valley.

Wind Patterns

During the summer, winds flowing from the northwest are drawn inland through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more directly from the west as they stream through the Golden Gate. This channeling of wind through the Golden Gate produces a jet that sweeps eastward and splits off to the northwest toward Richmond and to the southwest toward San Jose when it meets the East Bay hills.

Wind speeds may be strong locally in areas where air is channeled through a narrow opening, such as the Carquinez Strait, the Golden Gate or the San Bruno gap. For example, the average wind speed at San Francisco International Airport in July is about 17 knots (from 3 p.m. to 4 p.m.), compared with only 7 knots at San Jose and less than 6 knots at the Farallon Islands.

The air flowing in from the coast to the Central Valley, called the sea breeze, begins developing at or near ground level along the coast in late morning or early afternoon. As the day progresses, the sea breeze layer deepens and increases in velocity while spreading inland. The depth of the sea breeze depends in large part upon the height and strength of the inversion. If the inversion is low and strong, and hence stable, the flow of the sea breeze will be inhibited and stagnant conditions are likely to result.

In the winter, the SFBAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Winter stagnation episodes are characterized by nighttime drainage flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the SFBAAB.

Temperature

Summertime temperatures in the SFBAAB are determined in large part by the effect of differential heating between land and water surfaces. Because land tends to heat up and cool off more quickly than water, a large-scale gradient (differential) in temperature is often created between the coast and the Central Valley, and small-scale local gradients are often produced along the shorelines of the ocean and bays. The temperature gradient near the ocean is also exaggerated, especially in summer, because of the upwelling of cold ocean bottom water along the coast. On summer afternoons the temperatures at the coast can be 35°F cooler than temperatures 15 to 20 miles inland. At night this contrast usually decreases to less than 10°.

In the winter, the relationship of minimum and maximum temperatures is reversed. During the daytime the temperature contrast between the coast and inland areas is small, whereas at night the variation in temperature is large.

Precipitation

The SFBAAB is characterized by moderately wet winters and dry summers. Winter rains account for about 75 percent of the average annual rainfall. The amount of annual precipitation can vary greatly from one part of the SFBAAB to another even within short distances. In general, total annual rainfall can reach 40 inches in the mountains, but it is often less than 16 inches in sheltered valleys.



During rainy periods, ventilation (rapid horizontal movement of air and injection of cleaner air) and vertical mixing are usually high, and thus pollution levels tend to be low. However, frequent dry periods do occur during the winter where mixing and ventilation are low and pollutant levels build up.

Air Pollution Potential

The potential for high pollutant concentrations developing at a given location depends upon the quantity of pollutants emitted into the atmosphere in the surrounding area or upwind, and the ability of the atmosphere to disperse the contaminated air. The topographic and climatological factors discussed above influence the atmospheric pollution potential of an area. Atmospheric pollution potential, as the term is used here, is independent of the location of emission sources and is instead a function of factors described below.

Wind Circulation

Low wind speed contributes to the buildup of air pollution because it allows more pollutants to be emitted into the air mass per unit of time. Light winds occur most frequently during periods of low sun (fall and winter, and early morning) and at night. These are also periods when air pollutant emissions from some sources are at their peak, namely, commute traffic (early morning) and wood burning appliances (nighttime). The problem can be compounded in valleys, when weak flows carry the pollutants upvalley during the day, and cold air drainage flows move the air mass downvalley at night. Such restricted movement of trapped air provides little opportunity for ventilation and leads to buildup of pollutants to potentially unhealthy levels.

Wind-roses provide useful information for communities that contain industry, landfills or other potentially odorous or noxious land uses. Each wind-rose diagram provides a general indication of the proportion of time that winds blow from each compass direction. The longer the vector length, the greater the frequency of wind occurring from that direction. Such information may be particularly useful in planning buffer zones. For example, sensitive receptors such as residential developments, schools or hospitals are inappropriate uses immediately downwind from facilities that emit toxic or odorous pollutants, unless adequate separation is provided by a buffer zone. Caution should be taken in using wind-roses in planning and environmental review processes. A site on the opposite side of a hill or tall building, even a short distance from a meteorological monitoring station, may experience a significant difference in wind pattern. Consult BAAQMD meteorologists if more detailed wind circulation information is needed.

Inversions

An inversion is a layer of warmer air over a layer of cooler air. Inversions affect air quality conditions significantly because they influence the mixing depth, i.e., the vertical depth in the atmosphere available for diluting air contaminants near the ground. The highest air pollutant concentrations in the SFBAAB generally occur during inversions.

There are two types of inversions that occur regularly in the SFBAAB. One is more common in the summer and fall, while the other is most common during the winter. The frequent occurrence of elevated temperature inversions in summer and fall months acts to cap the mixing depth, limiting the depth of air available for dilution. Elevated inversions are caused by subsiding air from the subtropical high pressure zone, and from the cool marine air layer that is drawn into the SFBAAB by the heated low pressure region in the Central Valley.

The inversions typical of winter, called radiation inversions, are formed as heat quickly radiates from the earth's surface after sunset, causing the air in contact with it to rapidly cool. Radiation inversions are strongest on clear, low-wind, cold winter nights, allowing the build-up of such pollutants as carbon monoxide and particulate matter. When wind speeds are low, there is little mechanical turbulence to mix the air, resulting in a layer of warm air over a layer of cooler air next



to the ground. Mixing depths under these conditions can be as shallow as 50 to 100 meters, particularly in rural areas. Urban areas usually have deeper minimum mixing layers because of heat island effects and increased surface roughness. During radiation inversions downwind transport is slow, the mixing depths are shallow, and turbulence is minimal, all factors which contribute to ozone formation.

Although each type of inversion is most common during a specific season, either inversion mechanism can occur at any time of the year. Sometimes both occur simultaneously. Moreover, the characteristics of an inversion often change throughout the course of a day. The terrain of the SFBAAB also induces significant variations among subregions.

Solar Radiation

The frequency of hot, sunny days during the summer months in the SFBAAB is another important factor that affects air pollution potential. It is at the higher temperatures that ozone is formed. In the presence of ultraviolet sunlight and warm temperatures, reactive organic gases and oxides of nitrogen react to form secondary photochemical pollutants, including ozone.

Because temperatures in many of the SFBAAB inland valleys are so much higher than near the coast, the inland areas are especially prone to photochemical air pollution.

In late fall and winter, solar angles are low, resulting in insufficient ultraviolet light and warming of the atmosphere to drive the photochemical reactions. Ozone concentrations do not reach significant levels in the SFBAAB during these seasons.

Sheltered Terrain

The hills and mountains in the SFBAAB contribute to the high pollution potential of some areas. During the day, or at night during windy conditions, areas in the lee sides of mountains are sheltered from the prevailing winds, thereby reducing turbulence and downwind transport. At night, when wind speeds are low, the upper atmospheric layers are often decoupled from the surface layers during radiation conditions. If elevated terrain is present, it will tend to block pollutant transport in that direction. Elevated terrain also can create a recirculation pattern by inducing upvalley air flows during the day and reverse downvalley flows during the night, allowing little inflow of fresh air.

The areas having the highest air pollution potential tend to be those that experience the highest temperatures in the summer and the lowest temperatures in the winter. The coastal areas are exposed to the prevailing marine air, creating cooler temperatures in the summer, warmer temperatures in winter, and stratus clouds all year. The inland valleys are sheltered from the marine air and experience hotter summers and colder winters. Thus, the topography of the inland valleys creates conditions conducive to high air pollution potential.

Pollution Potential Related to Emissions

Although air pollution potential is strongly influenced by climate and topography, the air pollution that occurs in a location also depends upon the amount of air pollutant emissions in the surrounding area or transported from more distant places. Air pollutant emissions generally are highest in areas that have high population densities, high motor vehicle use and/or industrialization. These contaminants created by photochemical processes in the atmosphere, such as ozone, may result in high concentrations many miles downwind from the sources of their precursor chemicals.

Climatological Subregions

This section discusses the varying climatological and topographic conditions, and the resulting variations in air pollution potential, within inhabited subregions of the SFBAAB. All urbanized areas of the SFBAAB are included in one of 11 climatological subregions. Sparsely inhabited



areas are excluded from the subregional designations. Some of the climatological subregions discussed in this appendix overlap county boundaries. The Lead Agencies analyzing projects located close to the boundary between subregions may need to examine the characteristics of the neighboring subregions to adequately evaluate potential air quality impacts.

The information about each subregion includes location, topography and climatological factors relevant to air quality. Where relevant to air quality concerns, more localized subareas within a subregion are discussed. Each subregional section concludes with a discussion of pollution potential resulting from climatological and topographic variables and the major types of air pollutant sources in the subregion.

Carquinez Strait Region

The Carquinez Strait runs from Rodeo to Martinez. It is the only sea-level gap between the Bay and the Central Valley. The subregion includes the lowlands bordering the strait to the north and south, and includes the area adjoining Suisun Bay and the western part of the Sacramento-San Joaquin Delta as far east as Bethel Island. The subregion extends from Rodeo in the southwest and Vallejo in the northwest to Fairfield on the northeast and Brentwood on the southeast.

Prevailing winds are from the west in the Carquinez Strait. During the summer and fall months, high pressure offshore coupled with low pressure in the Central Valley causes marine air to flow eastward through the Carquinez Strait. The wind is strongest in the afternoon. Afternoon wind speeds of 15 to 20 mph are common throughout the strait region. Annual average wind speeds are 8 mph in Martinez, and 9 to 10 mph further east. Sometimes atmospheric conditions cause air to flow from the east. East winds usually contain more pollutants than the cleaner marine air from the west. In the summer and fall months, this can cause elevated pollutant levels to move into the central SFBAAB through the strait. These high pressure periods are usually accompanied by low wind speeds, shallow mixing depths, higher temperatures and little or no rainfall.

Summer mean maximum temperatures reach about 90° F. in the subregion. Mean minimum temperatures in the winter are in the high 30's. Temperature extremes are especially pronounced in sheltered areas farther from the moderating effects of the strait itself, e.g. at Fairfield.

Many industrial facilities with significant air pollutant emissions — e.g., chemical plants and refineries — are located within the Carquinez Strait Region. The pollution potential of this area is often moderated by high wind speeds. However, upsets at industrial facilities can lead to short-term pollution episodes, and emissions of unpleasant odors may occur at anytime. Receptors downwind of these facilities could suffer more long-term exposure to air contaminants than individuals elsewhere. It is important that local governments and other Lead Agencies maintain buffers zones around sources of air pollution sufficient to avoid adverse health and nuisance impacts on nearby receptors. Areas of the subregion that are traversed by major roadways, e.g. Interstate 80, may also be subject to higher local concentrations of carbon monoxide and particulate matter, as well as certain toxic air contaminants such as benzene.

Cotati and Petaluma Valleys

The subregion that stretches from Santa Rosa to the San Pablo Bay is often considered as two different valleys: the Cotati Valley in the north and the Petaluma Valley in the south. To the east, the valley is bordered by the Sonoma Mountains, while to the west is a series of low hills, followed by the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area allows marine air to travel into the SFBAAB.

Wind patterns in the Petaluma and Cotati Valleys are strongly influenced by the Petaluma Gap, with winds flowing predominantly from the west. As marine air travels through the Petaluma Gap, it splits into northward and southward paths moving into the Cotati and Petaluma valleys. The



southward path crosses San Pablo Bay and moves eastward through the Carquinez Strait. The northward path contributes to Santa Rosa's prevailing winds from the south and southeast. Petaluma's prevailing winds are from the northwest.

When the ocean breeze is weak, strong winds from the east can predominate, carrying pollutants from the Central Valley and the Carquinez Strait. During these periods, upvalley flows can carry the polluted air as far north as Santa Rosa.

Winds are usually stronger in the Petaluma Valley than the Cotati Valley because the former is directly in line with the Petaluma Gap. Petaluma's climate is similar to areas closer to the coast even though Petaluma is 28 miles from the ocean. Average annual wind speed at the Petaluma Airport is seven mph. The Cotati Valley, being slightly north of the Petaluma Gap, experiences lower wind speeds. The annual average wind speed in Santa Rosa is five mph.

Air temperatures are very similar in the two valleys. Summer maximum temperatures for this subregion are in the low-to-mid-80's, while winter maximum temperatures are in the high-50's to low-60's. Summer minimum temperatures are around 50 degrees, and winter minimum temperatures are in the high 30's.

Generally, air pollution potential is low in the Petaluma Valley because of its link to the Petaluma Gap and because of its low population density. There are two scenarios that could produce elevated pollutant levels: 1) stagnant conditions in the morning hours created when a weak ocean breeze meets a weak bay breeze, and 2) an eastern or southeastern wind pattern in the afternoon brings in pollution from the Carquinez Strait Region and the Central Valley.

The Cotati Valley has a higher pollution potential than does the Petaluma Valley. The Cotati Valley lacks a gap to the sea, contains a larger population and has natural barriers at its northern and eastern ends. There are also industrial facilities in and around Santa Rosa. Both valleys of this subregion are also threatened by increased motor vehicle traffic and the associated air contaminants. Population and motor vehicle use are increasing significantly, and housing costs and the suburbanization of employment are leading to more and longer commutes traversing the subregion.

Diablo and San Ramon Valleys

East of the Coast Range lay the Diablo and San Ramon Valleys. The valleys have a northwest to southeast orientation, with the northern portion known as Diablo Valley and the southern portion as San Ramon Valley. The Diablo Valley is bordered in the north by the Carquinez Strait and in the south by the San Ramon Valley. The San Ramon Valley is long and narrow and extends south from Walnut Creek to Dublin. At its southern end it opens onto the Amador Valley.

The mountains on the west side of these valleys block much of the marine air from reaching the valleys. During the daytime, there are two predominant flow patterns: an upvalley flow from the north and a westerly flow (wind from the west) across the lower elevations of the Coast Range. On clear nights, surface inversions separate the flow of air into two layers: the surface flow and the upper layer flow. When this happens, there are often drainage surface winds which flow downvalley toward the Carquinez Strait.

Wind speeds in these valleys generally are low. Monitoring stations in Concord and Danville report annual average wind speeds of 5 mph. Winds can increase in the afternoon near San Ramon because it is located at the eastern edge of the Crow Canyon gap. Through this gap, polluted air from cities near the Bay travels to the valley in the summer months.

Air temperatures in these valleys are cooler in the winter and warmer in the summer than are temperatures further west, as these valleys are far from the moderating effect of the Bay and



ocean. Mean summer maximum temperatures are in the low- to mid-80's. Mean winter minimum temperatures are in the high-30's to low-40's.

Pollution potential is relatively high in these valleys. On winter evenings, light winds combined with surface-based inversions and terrain that restricts air flow can cause pollutant levels to build up. San Ramon Valley can experience high pollution concentrations due to motor vehicle emissions and emissions from fireplaces and wood stoves. In the summer months, ozone and ozone precursors are often transported into the valleys from both the central SFBAAB and the Central Valley.

Livermore Valley

The Livermore Valley is a sheltered inland valley near the eastern border of SFBAAB. The western side of the valley is bordered by 1,000 to 1,500 foot hills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass and Niles Canyon. The eastern side of the valley also is bordered by 1,000 to 1,500 foot hills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest to southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high.

During the summer months, when there is a strong inversion with a low ceiling, air movement is weak and pollutants become trapped and concentrated. Maximum summer temperatures in the Livermore Valley range from the high-80's to the low-90's, with extremes in the 100's. At other times in the summer, a strong Pacific high pressure cell from the west, coupled with hot inland temperatures causes a strong onshore pressure gradient which produces a strong, afternoon wind. With a weak temperature inversion, air moves over the hills with ease, dispersing pollutants.

In the winter, with the exception of an occasional storm moving through the area, air movement is often dictated by local conditions. At night and early morning, especially under clear, calm and cold conditions, gravity drives cold air downward. The cold air drains off the hills and moves into the gaps and passes. On the eastern side of the valley the prevailing winds blow from north, northeast and east out of the Altamont Pass. Winds are light during the late night and early morning hours. Winter daytime winds sometimes flow from the south through the Altamont Pass to the San Joaquin Valley. Average winter maximum temperatures range from the high-50's to the low-60's, while minimum temperatures are from the mid-to-high-30's, with extremes in the high teens and low-20's.

Air pollution potential is high in the Livermore Valley, especially for photochemical pollutants in the summer and fall. High temperatures increase the potential for ozone to build up. The valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone may be carried west from the San Joaquin Valley to the Livermore Valley.

During the winter, the sheltering effect of the valley, its distance from moderating water bodies, and the presence of a strong high pressure system contribute to the development of strong, surface-based temperature inversions. Pollutants such as carbon monoxide and particulate matter, generated by motor vehicles, fireplaces and agricultural burning, can become concentrated. Air pollution problems could intensify because of population growth and increased commuting to and through the subregion.



Marin County Basins

Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate and on the north by the Petaluma Gap. Most of Marin's population lives in the eastern part of the county, in small, sheltered valleys. These valleys act like a series of miniature air basins.

Although there are a few mountains above 1500 feet, most of the terrain is only 800 to 1000 feet high, which usually is not high enough to block the marine layer. Because of the wedge shape of the county, northeast Marin County is further from the ocean than is the southeastern section. This extra distance from the ocean allows the marine air to be moderated by bayside conditions as it travels to northeastern Marin County. In southern Marin the distance from the ocean is short and elevations are lower, resulting in higher incidence of maritime air in that area.

Wind speeds are highest along the west coast of Marin, averaging about 8 to 10 miles per hour. The complex terrain in central Marin creates sufficient friction to slow the air flow. At Hamilton Air Force Base, in Novato, the annual average wind speeds are only 5 mph. The prevailing wind directions throughout Marin County are generally from the northwest.

In the summer months, areas along the coast are usually subject to onshore movement of cool marine air. In the winter, proximity to the ocean keeps the coastal regions relatively warm, with temperatures varying little throughout the year. Coastal temperatures are usually in the high-50's in the winter and the low-60's in the summer. The warmest months are September and October.

The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of the marine air. The temperatures of cities next to the Bay are moderated by the cooling effect of the Bay in the summer and the warming effect of the Bay in the winter. For example, San Rafael experiences average maximum summer temperatures in the low-80's and average minimum winter temperatures in the low-40's. Inland towns such as Kentfield experience average maximum temperatures that are two degrees cooler in the winter and two degrees warmer in the summer.

Air pollution potential is highest in eastern Marin County, where most of population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low. As development moves further north, there is greater potential for air pollution to build up because the valleys are more sheltered from the sea breeze. While Marin County does not have many polluting industries, the air quality on its eastern side — especially along the U.S. 101 corridor — may be affected by emissions from increasing motor vehicle use within and through the county.

Napa Valley

The Napa Valley is bordered by relatively high mountains. With an average ridge line height of about 2000 feet, with some peaks approaching 3000 to 4000 feet, these mountains are effective barriers to the prevailing northwesterly winds. The Napa Valley is widest at its southern end and narrows in the north.

During the day, the prevailing winds flow upvalley from the south about half of the time. A strong upvalley wind frequently develops during warm summer afternoons, drawing air in from the San Pablo Bay. Daytime winds sometimes flow downvalley from the north. During the evening, especially in the winter, downvalley drainage often occurs. Wind speeds are generally low, with almost 50 percent of the winds less than 4 mph. Only 5 percent of the winds are between 16 and 18 mph, representing strong summertime upvalley winds and winter storms.

Summer average maximum temperatures are in the low 80's at the southern end of the valley and in the low 90's at the northern end. Winter average maximum temperatures are in the high-



50's and low-60's, and minimum temperatures are in the high to mid 30's with the slightly cooler temperatures in the northern end.

The air pollution potential in the Napa Valley could be high if there were sufficient sources of air contaminants nearby. Summer and fall prevailing winds can transport ozone precursors northward from the Carquinez Strait Region to the Napa Valley, effectively trapping and concentrating the pollutants when stable conditions are present. The local upslope and downslope flows created by the surrounding mountains may also recirculate pollutants already present, contributing to buildup of air pollution. High ozone concentrations are a potential problem to sensitive crops such as wine grapes, as well as to human health. The high frequency of light winds and stable conditions during the late fall and winter contribute to the buildup of particulate matter from motor vehicles, agriculture and wood burning in fireplaces and stoves.

Northern Alameda and Western Contra Costa Counties

This climatological subregion stretches from Richmond to San Leandro. Its western boundary is defined by the Bay and its eastern boundary by the Oakland-Berkeley Hills. The Oakland-Berkeley Hills have a ridge line height of approximately 1500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between the Bay and the lower hills.

In this area, marine air traveling through the Golden Gate, as well as across San Francisco and through the San Bruno Gap, is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west. At the northern end, near Richmond, prevailing winds are from the south-southwest.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures during summer average in the mid-70's, with minimums in the mid-50's. Winter highs are in the mid- to high-50's, with lows in the low- to mid-40's.

The air pollution potential is lowest for the parts of the subregion that are closest to the bay, due largely to good ventilation and less influx of pollutants from upwind sources. The occurrence of light winds in the evenings and early mornings occasionally causes elevated pollutant levels.

The air pollution potential at the northern (Richmond) and southern (Oakland, San Leandro) parts of this subregion is marginally higher than communities directly east of the Golden Gate, because of the lower frequency of strong winds.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. The subregion is also traversed by frequently congested major freeways. Traffic and congestion, and the motor vehicle emissions they generate, are increasing.

Peninsula

The peninsula region extends from northwest of San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the peninsula, with elevations exceeding 2000 feet at the southern end, decreasing to 500 feet in South San Francisco. Coastal towns experience a high incidence of cool, foggy weather in the summer. Cities in the southeastern peninsula experience warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy.

The blocking effect of the Santa Cruz Mountains results in variations in summertime maximum temperatures in different parts of the peninsula. For example, in coastal areas and San Francisco



the mean maximum summer temperatures are in the mid-60's, while in Redwood City the mean maximum summer temperatures are in the low-80's. Mean minimum temperatures during the winter months are in the high-30's to low-40's on the eastern side of the Peninsula and in the low 40's on the coast.

Two important gaps in the Santa Cruz Mountains occur on the peninsula. The larger of the two is the San Bruno Gap, extending from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are less than 200 feet, marine air is easily able to penetrate into the bay. The other gap is the Crystal Springs Gap, between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen from San Mateo to Redwood City.

Annual average wind speeds range from 5 to 10 mph throughout the peninsula, with higher wind speeds usually found along the coast. Winds on the eastern side of the peninsula are often high in certain areas, such as near the San Bruno Gap and the Crystal Springs Gap.

The prevailing winds along the peninsula's coast are from the west, although individual sites can show significant differences. For example, Fort Funston in western San Francisco shows a southwest wind pattern while Pillar Point in San Mateo County shows a northwest wind pattern. On the east side of the mountains winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features.

Air pollution potential is highest along the southeastern portion of the peninsula. This is the area most protected from the high winds and fog of the marine layer. Pollutant transport from upwind sites is common. In the southeastern portion of the peninsula, air pollutant emissions are relatively high due to motor vehicle traffic as well as stationary sources. At the northern end of the peninsula in San Francisco, pollutant emissions are high, especially from motor vehicle congestion. Localized pollutants, such as carbon monoxide, can build up in "urban canyons." Winds are generally fast enough to carry the pollutants away before they can accumulate.

Santa Clara Valley

The Santa Clara Valley is bounded by the Bay to the north and by mountains to the east, south and west. Temperatures are warm on summer days and cool on summer nights, and winter temperatures are fairly mild. At the northern end of the valley, mean maximum temperatures are in the low-80's during the summer and the high-50's during the winter, and mean minimum temperatures range from the high-50's in the summer to the low-40's in the winter. Further inland, where the moderating effect of the Bay is not as strong, temperature extremes are greater. For example, in San Martin, located 27 miles south of the San Jose Airport, temperatures can be more than 10 degrees warmer on summer afternoons and more than 10 degrees cooler on winter nights.

Winds in the valley are greatly influenced by the terrain, resulting in a prevailing flow that roughly parallels the valley's northwest-southeast axis. A north-northwesterly sea breeze flows through the valley during the afternoon and early evening, and a light south-southeasterly drainage flow occurs during the late evening and early morning. In the summer the southern end of the valley sometimes becomes a "convergence zone," when air flowing from the Monterey Bay gets channeled northward into the southern end of the valley and meets with the prevailing north-northwesterly winds.

Wind speeds are greatest in the spring and summer and weakest in the fall and winter. Nighttime and early morning hours frequently have calm winds in all seasons, while summer afternoons and



evenings are quite breezy. Strong winds are rare, associated mostly with the occasional winter storm.

The air pollution potential of the Santa Clara Valley is high. High summer temperatures, stable air and mountains surrounding the valley combine to promote ozone formation. In addition to the many local sources of pollution, ozone precursors from San Francisco, San Mateo and Alameda Counties are carried by prevailing winds to the Santa Clara Valley. The valley tends to channel pollutants to the southeast. In addition, on summer days with low level inversions, ozone can be recirculated by southerly drainage flows in the late evening and early morning and by the prevailing northwesterlies in the afternoon. A similar recirculation pattern occurs in the winter, affecting levels of carbon monoxide and particulate matter. This movement of the air up and down the valley increases the impact of the pollutants significantly.

Pollution sources are plentiful and complex in this subregion. The Santa Clara Valley has a high concentration of industry at the northern end, in the Silicon Valley. Some of these industries are sources of air toxics as well as criteria air pollutants. In addition, Santa Clara Valley's large population and many work-site destinations generate the highest mobile source emissions of any subregion in the SFBAAB.

Sonoma Valley

The Sonoma Valley is west of the Napa Valley. It is separated from the Napa Valley and from the Cotati and Petaluma Valleys by mountains. The Sonoma Valley is long and narrow, approximately 5 miles wide at its southern end and less than a mile wide at the northern end.

The climate is similar to that of the Napa Valley, with the same basic wind characteristics. The strongest upvalley winds occur in the afternoon during the summer and the strongest downvalley winds occur during clear, calm winter nights. Prevailing winds follow the axis of the valley, northwest/southeast, while some upslope flow during the day and downslope flow during the night occurs near the base of the mountains. Summer average maximum temperatures are usually in the high-80's, and summer minimums are around 50 degrees. Winter maximums are in the high-50's to the mid-60's, with minimums ranging from the mid-30's to low-40's.

As in the Napa Valley, the air pollution potential of the Sonoma Valley could be high if there were significant sources of pollution nearby. Prevailing winds can transport local and nonlocally generated pollutants northward into the narrow valley, which often traps and concentrates the pollutants under stable conditions. The local upslope and downslope flows set up by the surrounding mountains may also recirculate pollutants.

However, local sources of air pollution are minor. With the exception of some processing of agricultural goods, such as wine and cheese manufacturing, there is little industry in this valley. Increases in motor vehicle emissions and woodsmoke emissions from stoves and fireplaces may increase pollution as the valley grows in population and as a tourist attraction.

Southwestern Alameda County

This subregion encompasses the southeast side of San Francisco Bay, from Dublin Canyon to north of Milpitas. The subregion is bordered on the east by the East Bay hills and on the west by the bay. Most of the area is flat.

This subregion is indirectly affected by marine air flow. Marine air entering through the Golden Gate is blocked by the East Bay hills, forcing the air to diverge into northerly and southerly paths. The southern flow is directed down the bay, parallel to the hills, where it eventually passes over southwestern Alameda County. These sea breezes are strongest in the afternoon. The further from the ocean the marine air travels, the more the ocean's effect is diminished. Although the



climate in this region is affected by sea breezes, it is affected less so than the regions closer to the Golden Gate.

The climate of southwestern Alameda County is also affected by its close proximity to San Francisco Bay. The Bay cools the air with which it comes in contact during warm weather, while during cold weather the Bay warms the air. The normal northwest wind pattern carries this air onshore. Bay breezes push cool air onshore during the daytime and draw air from the land offshore at night.

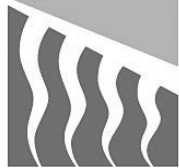
Winds are predominantly out of the northwest during the summer months. In the winter, winds are equally likely to be from the east. Easterly-southeasterly surface flow into southern Alameda County passes through three major gaps: Hayward/Dublin Canyon, Niles Canyon and Mission Pass. Areas north of the gaps experience winds from the southeast, while areas south of the gaps experience winds from the northeast. Wind speeds are moderate in this subregion, with annual average wind speeds close to the Bay at about 7 mph, while further inland they average 6 mph.

Air temperatures are moderated by the subregion's proximity to the Bay and to the sea breeze. Temperatures are slightly cooler in the winter and slightly warmer in the summer than East Bay cities to the north. During the summer months, average maximum temperatures are in the mid-70's. Average maximum winter temperatures are in the high-50's to low-60's. Average minimum temperatures are in the low 40's in winter and mid-50's in the summer.

Pollution potential is relatively high in this subregion during the summer and fall. When high pressure dominates, low mixing depths and Bay and ocean wind patterns can concentrate and carry pollutants from other cities to this area, adding to the locally emitted pollutant mix. The polluted air is then pushed up against the East Bay hills. In the wintertime, the air pollution potential in southwestern Alameda County is moderate. Air pollution sources include light and heavy industry, and motor vehicles. Increasing motor vehicle traffic and congestion in the subregion may increase Southwest Alameda County pollution as well as that of its neighboring subregions.

C.1.2. Existing Ambient Air Quality: Criteria Air Pollutants

The California Air Resources Board (ARB) and the U.S. Environmental Protection Agency (EPA) currently focus on the following air pollutants as indicators of ambient air quality: ozone, particulate matter (PM), nitrogen dioxide (NO₂), CO, sulfur dioxide (SO₂), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants." Sources and health effects of the criteria air pollutants are summarized in Table C.2. Current state and federal air quality standards are available at <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf> and designations are available at <http://www.arb.ca.gov/desig/desig.htm>. See Table C.1 for current attainment status.



**Table C.1
Ambient Air Quality Standards and Designations**

Pollutant	Averaging Time	California		National Standards ^a		
		Standards ^{b,c}	Attainment Status ^d	Primary ^e	Secondary ^{c,f}	Attainment Status ^g
Ozone	1-hour	0.09 ppm (180 µg/m ³)	N (Serious)	- ^h	Same as Primary Standard	- ^h
	8-hour	0.070 ppm (137 µg/m ³)	-	0.075 ppm (147 µg/m ³)		N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m ³)	A	35 ppm (40 mg/m ³)	-	U/A
	8-hour	9 ppm (10 mg/m ³)		9 ppm (10 mg/m ³)		
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.030 ppm (57 µg/m ³)	-	0.053 ppm (100 µg/m ³)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (339 µg/m ³)	A	-		
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	-	-	0.030 ppm (80 µg/m ³)	-	-
	24-hour	0.04 ppm (105 µg/m ³)	A	0.14 ppm (365 µg/m ³)	-	A
	3-hour	-	-	-	0.5 ppm (1300 µg/m ³)	-
	1-hour	0.25 ppm (655 µg/m ³)	A	-	-	-
Respirable Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	20 µg/m ³	N	- ^h	Same as Primary Standard	U
	24-hour	50 µg/m ³		150 µg/m ³		
Fine Particulate Matter (PM _{2.5})	Annual Arithmetic Mean	12 µg/m ³	N	15 µg/m ³	Same as Primary Standard	N ⁱ
	24-hour	-		35 µg/m ³		
Lead ⁱ	30-day Average	1.5 µg/m ³	A	-	-	-
	Calendar Quarter	-	-	1.5 µg/m ³	Same as Primary Standard	-

**Table C.1
Ambient Air Quality Standards and Designations**

Pollutant	Averaging Time	California		National Standards ^a		
		Standards ^{b,c}	Attainment Status ^d	Primary ^{c,e}	Secondary ^{c,f}	Attainment Status ^g
Sulfates	24-hour	25 µg/m ³	A			
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)	U			
Vinyl Chloride ⁱ	24-hour	0.01 ppm (26 µg/m ³)	-			No National Standards
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

^a National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM₁₀ 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The PM_{2.5} 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

^b California standards for ozone, CO (except Lake Tahoe), SO₂ (1- and 24-hour), NO₂, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equal or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^c Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter (µg/m³)]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment. Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period. Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area. Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

^e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

^f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^g Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassified (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

^h The 1-hour ozone NAAQS was revoked on June 15, 2005 and the annual PM₁₀ NAAQS was revoked in 2006.

ⁱ ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for this pollutant.

^j U.S. EPA lowered the 24-hour PM_{2.5} standard from 65 µg/m³ to 35 µg/m³ in 2006. EPA issued attainment status designations for the 35 µg/m³ standard on December 22, 2008. EPA has designated the Bay Area as nonattainment for the 35 µg/m³ PM_{2.5} standard. The EPA designation will be effective 90 days after publication of the regulation in the Federal Register.



**Table C.2
Common Sources of Health Effects for Criteria Air Pollutants**

Pollutants	Sources	Health Effects
Ozone	Atmospheric reaction of organic gases with nitrogen oxides in sunlight	Aggravation of respiratory and cardiovascular diseases; reduced lung function; increased cough and chest discomfort
Fine Particulate Matter (PM ₁₀ and PM _{2.5})	Stationary combustion of solid fuels; construction activities; industrial processes; atmospheric chemical reactions	Reduced lung function; aggravation of respiratory and cardiovascular diseases; increases in mortality rate; reduced lung function growth in children
Nitrogen Dioxide (NO ₂)	Motor vehicle exhaust; high temperature stationary combustion; atmospheric reactions	Aggravation of respiratory illness
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust; natural events, such as decomposition of organic matter	Aggravation of some heart diseases; reduced tolerance for exercise; impairment of mental function; birth defects; death at high levels of exposure
Sulfur Dioxide (SO ₂)	Combination of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ore; industrial processes	Aggravation of respiratory diseases; reduced lung function
Lead	Contaminated soil	Behavioral and hearing disabilities in children; nervous system impairment

Source: South Coast Air Quality Management District 2005; EPA 2009; EDAW 2009

Ozone, or smog, is not emitted directly into the environment, but is formed in the atmosphere by complex chemical reactions between ROG and NO_x in the presence of sunlight. Ozone formation is greatest on warm, windless, sunny days. The main sources of NO_x and ROG, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) the evaporation of solvents, paints, and fuels, and biogenic sources. Automobiles are the single largest source of ozone precursors in the SFBAAB. Tailpipe emissions of ROG are highest during cold starts, hard acceleration, stop-and-go conditions, and slow speeds. They decline as speeds increase up to about 50 mph, then increase again at high speeds and high engine loads. ROG emissions associated with evaporation of unburned fuel depend on vehicle and ambient temperature cycles. Nitrogen oxide emissions exhibit a different curve; emissions decrease as the vehicle approaches 30 mph and then begin to increase with increasing speeds.

Ozone levels usually build up during the day and peak in the afternoon hours. Short-term exposure can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, it can aggravate existing respiratory diseases such as asthma, bronchitis and emphysema. Chronic exposure to high ozone levels can permanently damage lung tissue. Ozone can also damage plants and trees, and materials such as rubber and fabrics.

Particulate Matter refers to a wide range of solid or liquid particles in the atmosphere, including smoke, dust, aerosols, and metallic oxides. Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM₁₀. PM_{2.5} includes a subgroup of finer particles that have an aerodynamic diameter of 2.5 micrometers or less. Some particulate matter,



such as pollen, is naturally occurring. In the SFBAAB most particulate matter is caused by combustion, factories, construction, grading, demolition, agricultural activities, and motor vehicles. Extended exposure to particulate matter can increase the risk of chronic respiratory disease. PM_{10} is of concern because it bypasses the body's natural filtration system more easily than larger particles, and can lodge deep in the lungs. The EPA and the state of California revised their PM standards several years ago to apply only to these fine particles. $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and contain substances that are particularly harmful to human health. Motor vehicles are currently responsible for about half of particulates in the SFBAAB. Wood burning in fireplaces and stoves is another large source of fine particulates.

Nitrogen Dioxide (NO_2) is a reddish-brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2 . Aside from its contribution to ozone formation, nitrogen dioxide can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

Carbon Monoxide (CO) is an odorless, colorless gas. It is formed by the incomplete combustion of fuels. The single largest source of CO in the SFBAAB is motor vehicles. Emissions are highest during cold starts, hard acceleration, stop-and-go driving, and when a vehicle is moving at low speeds. New findings indicate that CO emissions per mile are lowest at about 45 mph for the average light-duty motor vehicle and begin to increase again at higher speeds. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia, as well as fetuses. Even healthy people exposed to high CO concentrations can experience headaches, dizziness, fatigue, unconsciousness, and even death.

Sulfur Dioxide (SO_2) is a colorless acid gas with a pungent odor. It has potential to damage materials and it can have health effects at high concentrations. It is produced by the combustion of sulfur-containing fuels, such as oil, coal and diesel. SO_2 can irritate lung tissue and increase the risk of acute and chronic respiratory disease.

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically.

Monitoring Data

The BAAQMD operates a regional air quality monitoring network that regularly measures the concentrations of the five major criteria air pollutants. Air pollutant monitoring data is available at <http://www.arb.ca.gov/adam/welcome.html>. Air quality conditions in the SFBAAB have improved significantly since the BAAQMD was created in 1955. Ambient concentrations and the number of days on which the region exceeds standards have declined dramatically. Neither State nor



national ambient air quality standards of these chemicals have been violated in recent decades for nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and vinyl chloride.

Emissions Inventory

The BAAQMD estimates emissions of criteria air pollutants from approximately nine hundred source categories. The estimates are based on BAAQMD permit information for stationary sources (e.g., manufacturing industries, refineries, dry-cleaning operations), plus more generalized estimates for area sources (e.g., space heating, landscaping activities, use of consumer products) and mobile sources (e.g., trains, ships and planes, as well as on-road and off-road motor vehicles). BAAQMD emissions inventory data is available at <http://www.arb.ca.gov/ei/maps/statemap/dismap.htm>.

C.1.2. Existing Ambient Air Quality: Toxic Air Contaminants

In addition to the criteria air pollutants listed above, another group of pollutants, commonly referred to as toxic air contaminants (TACs) or hazardous air pollutants can result in health effects that can be quite severe. Many TACs are confirmed or suspected carcinogens, or are known or suspected to cause birth defects or neurological damage. Secondly, many TACs can be toxic at very low concentrations. For some chemicals, such as carcinogens, there are no thresholds below which exposure can be considered risk-free.

Industrial facilities and mobile sources are significant sources of TACs. The electronics industry, including semiconductor manufacturing, has the potential to contaminate both air and water due to the highly toxic chlorinated solvents commonly used in semiconductor production processes. Sources of TACs go beyond industry. Various common urban facilities also produce TAC emissions, such as gasoline stations (benzene), hospitals (ethylene oxide), and dry cleaners (perchloroethylene). Automobile exhaust also contains TACs such as benzene and 1,3-butadiene. Most recently, diesel particulate matter was identified as a TAC by the ARB. Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. BAAQMD research indicates that mobile-source emissions of diesel PM, benzene, and 1,3-butadiene represent a substantial portion of the ambient background risk from TACs in the SFBAAB.

C.1.3. Greenhouse Gases and Global Climate Change

Unlike emissions of criteria and toxic air pollutants, which have local or regional impacts, emissions of greenhouse gases (GHGs) that contribute to global warming or global climate change have a broader, global impact. Global warming is a process whereby GHGs accumulating in the atmosphere contribute to an increase in the temperature of the earth's atmosphere. The principal GHGs contributing to global warming are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated compounds. The primary GHGs of concern are summarized in Table C.3. These gases allow visible and ultraviolet light from the sun to pass through the atmosphere, but they prevent heat from escaping back out into space. Among the potential implications of global warming are rising sea levels, and adverse impacts to water supply, water quality, agriculture, forestry, and habitats. In addition, global warming may increase electricity demand for cooling, decrease the availability of hydroelectric power, and affect regional air quality and public health. Like most criteria and toxic air pollutants, much of the GHG production comes from motor vehicles. GHG emissions can be reduced to some degree by improved coordination of land use and transportation planning on the city, county, and subregional level, and other measures to reduce automobile use. Energy conservation measures also can contribute to reductions in GHG emissions.



Gas	Sources
Carbon dioxide (CO ₂)	Fossil fuel combustion in stationary and point sources; emission sources includes burning of oil, coal, gas.
Methane (CH ₄)	Incomplete combustion in forest fires, landfills, and leaks in natural gas and petroleum systems, agricultural activities, coal mining, wastewater treatment, and certain industrial processes.
Nitrous oxide (N ₂ O)	Fossil fuel combustion in stationary and point sources; other emission sources include agricultural soil management, animal manure management, sewage treatment, adipic acid production, and nitric acid production.
Chlorofluorocarbon (CFC), and Hydro-chlorofluorocarbon (HCFC)	Agents used in production of foam insulation; other sources include air conditioners, refrigerators, and solvents in cleaners.
Sulfur hexafluoride (SF ₆)	Electric insulation in high voltage equipment that transmits and distributes electricity, including circuit breakers, gas-insulated substations, and other switchgear used in the transmission system to manage the high voltages carried between generating stations and customer load centers.
Perfluorocarbons (PFC's)	Primary aluminum production and semiconductor manufacturing.
Source: EPA 2009	

California Greenhouse Gas Emissions Inventory

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Emissions of CO₂ are byproducts of fossil fuel combustion. CH₄, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) is largely associated with agricultural practices and landfills. N₂O is also largely attributable to agricultural practices and soil management. CO₂ sinks, or reservoirs, include vegetation and the ocean, which absorb CO₂ through sequestration and dissolution, respectively, two of the most common processes of CO₂ sequestration.

California produced 474 million gross metric tons (MMT) of CO₂ equivalent (CO₂e) averaged over the period from 2002-2004. CO₂e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, one ton of CH₄ has the same contribution to the greenhouse effect as approximately 23 tons of CO₂. Therefore, CH₄ is a much more potent GHG than CO₂. Expressing emissions in CO₂e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2002-2004, accounting for 38 percent of total GHG emissions in the state. This sector was followed by the electric power sector (including both in-state and out-of-state sources) (18 percent) and the industrial sector (21 percent).



California Greenhouse Gas Emissions Projections

The 1990 GHG emissions limit is approximately 430 MMT CO₂e, which must be met in California by 2020 per the requirements of AB 32 (discussed below in the Regulatory Setting). ARB's GHG inventory for all emissions sectors would require an approximate 28 percent reduction in GHG emissions from projected 2020 forecasts to meet the target emissions limit (equivalent to levels in 1990) established in AB 32. The AB 32 Scoping Plan, discussed further below, is ARB's plan for meeting this mandate.

C.1.4. Existing Ambient Air Quality: Odors and Dust

Other air quality issues of concern in the SFBAAB include nuisance impacts of odors and dust. Objectionable odors may be associated with a variety of pollutants. Common sources of odors include wastewater treatment plants, landfills, composting facilities, refineries and chemical plants. Similarly, nuisance dust may be generated by a variety of sources including quarries, agriculture, grading and construction. Odors rarely have direct health impacts, but they can be very unpleasant and can lead to anger and concern over possible health effects among the public. Each year the BAAQMD receives thousands of citizen complaints about objectionable odors. Dust emissions can contribute to increased ambient concentrations of PM₁₀, and can also contribute to reduced visibility and soiling of exposed surfaces.

REGULATORY SETTING

Air quality with respect to criteria air pollutants and TACs within the SFBAAB is regulated by such agencies as the BAAQMD, ARB, and EPA. Each of these agencies develops rules, regulations, policies, and/or goals to attain the goals or directives imposed through legislation. Although the EPA regulations may not be superseded, both state and local regulations may be more stringent.

C.1.5. Criteria Air Pollutants

Federal Air Quality Regulations

U.S. Environmental Protection Agency

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA), which was enacted in 1963. The FCAA was amended in 1970, 1977, and 1990.

The FCAA required EPA to establish primary and secondary NAAQS, which are available at <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 (FCAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility to review all state SIPs to determine conformation to the mandates of the FCAAA and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

State Air Quality Regulations

In 1992 and 1993, the California Air Resources Board (CARB) requested delegation of authority for the implementation and enforcement of specified New Source Performance Standards



(NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the following local agencies: Bay Area and South Coast Air Quality Management Districts (AQMDs). EPA's review of the State of California's laws, rules, and regulations showed them to be adequate for the implementation and enforcement of these federal standards, and EPA granted the delegations as requested.

California Air Resources Board

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), which was adopted in 1988. The CCAA requires that all air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

ARB is primarily responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. The ARB is primarily responsible for statewide pollution sources and produces a major part of the SIP. Local air districts are still relied upon to provide additional strategies for sources under their jurisdiction. The ARB combines this data and submits the completed SIP to EPA.

Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), establishing CAAQS (which in many cases are more stringent than the NAAQS), determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles.

Transport of Pollutants

The California Clean Air Act, Section 39610 (a), directs the ARB to "identify each district in which transported air pollutants from upwind areas outside the district cause or contribute to a violation of the ozone standard and to identify the district of origin of transported pollutants." The information regarding the transport of air pollutants from one basin to another was to be quantified to assist interrelated basins in the preparation of plans for the attainment of State ambient air quality standards. Numerous studies conducted by the ARB have identified air basins that are impacted by pollutants transported from other air basins (as of 1993). Among the air basins affected by air pollution transport from the SFBAAB are the North Central Coast Air Basin, the Mountain Counties Air Basin, the San Joaquin Valley Air Basin, and the Sacramento Valley Air Basin. The SFBAAB was also identified as an area impacted by the transport of air pollutants from the Sacramento region.

Local Air Quality Regulations

Bay Area Air Quality Management District

The BAAQMD attains and maintains air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. The BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the FCAA, FCAAA, and the CCAA.

In 2009, the BAAQMD released the update to its CEQA Guidelines. This is an advisory document that provides the Lead Agency, consultants, and project applicants with uniform procedures for



addressing air quality in environmental documents. The handbook contains the following applicable components:

1. Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
2. Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
3. Methods available to mitigate air quality impacts;
4. Information for use in air quality assessments and environmental documents that will be updated more frequently such as air quality data, regulatory setting, climate, topography.

Air Quality Plans

As stated above, the BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares ozone attainment plans (OAP) for the national ozone standard and clean air plans (CAP) for the California standard both in coordination with the Metropolitan Transportation Commission and the Association of Bay Area Governments (ABAG).

With respect to applicable air quality plans, the BAAQMD prepared the *2010 Clean Air Plan* to address nonattainment of the national 1-hour ozone standard in the SFBAAB. The purpose of the 2010 Clean Air Plan is to:

1. Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement “all feasible measures” to reduce ozone;
2. Consider the impacts of ozone control measures on particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
3. Review progress in improving air quality in recent years;
4. Establish emission control measures to be adopted or implemented in the 2009-2012 timeframe.

Similarly, the BAAQMD prepared the 2010 Clean Air Plan to address nonattainment of the CAAQS.

C.1.6. Toxic Air Contaminants

TACs, or in federal parlance under the FCAA, HAPs, are pollutants that result in an increase in mortality, a serious illness, or pose a present or potential hazard to human health. Health effects of TACs may include cancer, birth defects, and immune system and neurological damage.

TACs can be separated into carcinogens and noncarcinogens based on the nature of the physiological degradation associated with exposure to the pollutant. For regulatory purposes, carcinogens are assumed to have no safe threshold below which health impacts will not occur. Noncarcinogenic TACs differ in that there is a safe level in which it is generally assumed that no negative health impacts would occur. These levels are determined on a pollutant-by-pollutant basis.

It is important to understand that TACs are not considered criteria air pollutants and thus are not specifically addressed through the setting of ambient air quality standards. Instead, the EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology (MACT and BACT) to limit emissions. These in conjunction with additional rules set forth by the BAAQMD establish the regulatory framework for TACs.



Federal Hazardous Air Pollutant Program

Title III of the FCAAA requires the EPA to promulgate national emissions standards for hazardous air pollutants (NESHAPs). The NESHAP may differ for major sources than for area sources of HAPs (major sources are defined as stationary sources with potential to emit more than 10 tons per year [TPY] of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources). The emissions standards are to be promulgated in two phases. In the first phase (1992–2000), the EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. These standards are generally referred to as requiring MACT. These federal rules are also commonly referred to as MACT standards, because they reflect the Maximum Achievable Control Technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), the EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards. The FCAAA required the EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, §219 required the use of reformulated gasoline in selected U.S. cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions.

State Toxic Air Contaminant Programs

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified over 21 TACs, and adopted the EPA's list of HAPs as TACs. Most recently, diesel exhaust particulate was added to the ARB list of TACs. Once a TAC is identified, ARB's then adopts an Airborne Toxics Control Measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate TBACT to minimize emissions. None of the TACs identified by ARB have a safe threshold.

The Hot Spots Act requires that existing facilities that emit toxic substances above specified level:

1. Prepare a toxic emission inventory;
2. Prepare a risk assessment if emissions are significant;
3. Notify the public of significant risk levels;
4. Prepare and implement risk reduction measure.

ARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). In February 2000, ARB adopted a new public transit bus fleet rule and emission standards for new urban buses. These new rules and standards provide for 1) more stringent emission standards for some new urban bus engines beginning with 2002 model year engines, 2) zero-emission bus demonstration and purchase requirements applicable to transit agencies, and 3) reporting requirements with which transit agencies must demonstrate compliance with the urban transit bus fleet rule. Upcoming milestones include the low sulfur diesel fuel requirement, and tighter emission standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially less TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced



significantly over the last decade, and will be reduced further in California through a progression of regulatory measures [e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of ARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be reduced by 75% in 2010 and 85% in 2020 from the estimated year 2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

Local Air Quality Regulations

Bay Area Air Quality Management District

The BAAQMD has regulated TACs since the 1980s. At the local level, air pollution control or management districts may adopt and enforce ARB's control measures. Under BAAQMD Regulation 2-1 (General Permit Requirements), Regulation 2-2 (New Source Review), and Regulation 2-5 (New Source Review), all nonexempt sources that possess the potential to emit TACs are required to obtain permits from BAAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. The BAAQMD limits emissions and public exposure to TACs through a number of programs. The BAAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. In addition, the BAAQMD has adopted Regulation 11 Rules 2 and 14, which address asbestos demolition renovation, manufacturing, and standards for asbestos containing serpentine.

C.1.7. Greenhouse Gases and Global Climate Change

Federal Greenhouse Gas Regulations

Supreme Court Ruling

The U.S. Environmental Protection Agency (EPA) is the Federal agency responsible for implementing the Clean Air Act (CAA). The U.S. Supreme Court ruled in its decision in *Massachusetts et al. v. Environmental Protection Agency et al.* ([2007] 549 U.S. 05-1120), issued on April 2, 2007, that carbon dioxide (CO₂) is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs.

EPA Actions

In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO₂ per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.



Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Clean Air Act

On April 23, 2009, EPA published their Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CCA (Endangerment Finding) in the Federal Register. The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for “emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The proposed rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., carbon dioxide [CO₂], methane [CH₄], nitrous oxide [N₂O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF₆]) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.

The Administrator proposed the finding that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CCA. The evidence supporting this finding consists of human activity resulting in “high atmospheric levels” of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also proposed the finding that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. The proposed finding cites that in 2006, motor vehicles were the second largest contributor to domestic GHG emissions (24 percent of total) behind electricity generation. Furthermore, in 2005, the U.S. was responsible for 18 percent of global GHG emissions. Therefore, GHG emissions from motor vehicles and motor vehicle engines were found to contribute to air pollution that endangers public health and welfare.

State Greenhouse Gas Regulations

Assembly Bill 1493 (2002)

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that ARB develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state.”

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California’s existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for the 2016 model year are approximately 37percent lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with LVW of 3,751 pounds to gross vehicle



weight (GVW) of 8,500 pounds, as well as medium-duty passenger vehicles, GHG emissions would be reduced approximately 24 percent between 2009 and 2016.

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board, et al.*). The auto-makers' suit in the U.S. District Court for the Eastern District of California, contended California's implementation of regulations that, in effect, regulate vehicle fuel economy violates various federal laws, regulations, and policies.

On December 12, 2007, the Court found that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), these regulations would be consistent with and have the force of federal law, thus, rejecting the automakers' claim. This authorization to implement more stringent standards in California was requested in the form of a CAA Section 209, subsection (b) waiver in 2005. Since that time, EPA failed to act on granting California authorization to implement the standards. Governor Schwarzenegger and Attorney General Edmund G. Brown filed suit against EPA for the delay. In December 2007, EPA Administrator Stephen Johnson denied California's request for the waiver to implement AB 1493. Johnson cited the need for a national approach to reducing GHG emissions, the lack of a "need to meet compelling and extraordinary conditions", and the emissions reductions that would be achieved through the Energy Independence and Security Act of 2007 as the reasoning for the denial.

The state of California filed suit against EPA for its decision to deny the CAA waiver. The recent change in presidential administration directed EPA to reexamine its position for denial of California's CAA waiver and for its past opposition to GHG emissions regulation. California received the waiver, notwithstanding the previous denial by EPA, on June 30, 2009.

Assembly Bill 32 (2006), California Global Warming Solutions Act

In September 2006, the governor of California signed AB 32 (Chapter 488, Statutes of 2006), the California Global Warming Solutions Act of 2006, which enacted Sections 38500–38599 of the California Health and Safety Code. AB 32 requires the reduction of statewide GHG emissions to 1990 levels by 2020. This equates to an approximate 15 percent reduction compared to existing statewide GHG emission levels or a 30 percent reduction from projected 2020 "business as usual" emission levels. The required reduction will be accomplished through an enforceable statewide cap on GHG emissions beginning in 2012.

To effectively implement the statewide cap on GHG emissions, AB 32 directs ARB to develop and implement regulations that reduce statewide GHG emissions generated by stationary sources. Specific actions required of ARB under AB 32 include adoption of a quantified cap on GHG emissions that represent 1990 emissions levels along with disclosing how the cap was quantified, institution of a schedule to meet the emissions cap, and development of tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions needed to meet the cap.

In addition, AB 32 states that if any regulations established under AB 1493 (2002) cannot be implemented then ARB is required to develop additional, new regulations to control GHG emissions from vehicles as part of AB 32.

AB 32 Climate Change Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan*, which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons (MMT) of CO₂e, or approximately 30% from the state's projected 2020 emission level of 596 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 42 MMT CO₂e, or almost 10%,



from 2002-2004 average emissions). The *Scoping Plan* also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The *Scoping Plan* calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO₂e);
- the Low-Carbon Fuel Standard (15.0 MMT CO₂e);
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO₂e); and
- a renewable portfolio standard for electricity production (21.3 MMT CO₂e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the *Scoping Plan* does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions(meanwhile, ARB is also developing an additional protocol for community emissions). ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The *Scoping Plan* states that the ultimate GHG reduction assignment to local government operations is to be determined (ARB 2008). With regard to land use planning, the *Scoping Plan* expects approximately 5.0 MMT CO₂e will be achieved associated with implementation of SB 375, which is discussed further below.

Senate Bills 1078 and 107 and Executive Order S-14-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33 percent renewable power by 2020. Governor Schwarzenegger plans to propose legislative language that will codify the new higher standard.

Senate Bill 1368 (2006)

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

Senate Bill 97 (2007)

SB 97, signed by governor of California in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency by July 1, 2009 guidelines for mitigating GHG emissions or the effects of GHG emissions,



as required by CEQA. The California Resources Agency is required to certify and adopt these guidelines by January 1, 2010.

This bill also removes, both retroactively and prospectively, as legitimate causes of action in litigation any claim of inadequate CEQA analysis of effects of GHG emissions associated with environmental review for projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 (Proposition 1B) or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E). This provision will be repealed by provision of law on January 1, 2010 at that time such projects, if any remain unapproved, will no longer enjoy protection against litigation claims based on failure to adequately address issues related to GHG emissions.

Senate Bill 375 (2008)

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). The ARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. The ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. If MPOs do not meet the GHG reduction targets, transportation projects located in the MPO boundaries would not be eligible for funding programmed after January 1, 2012.

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located in an MPO that meets certain requirements. City or County land use policies (e.g., General Plans) are not required to be consistent with the RTP including associated SCSs or APSs. Qualified projects consistent with an approved SCS or APS and categorized as "transit priority projects" would receive incentives under new provisions of CEQA.

Executive Order S-3-05 (2005)

Governor Schwarzenegger signed Executive Order S-3-05 on June 1, 2005 which proclaimed California is vulnerable to the impacts of climate change. The executive order declared increased temperatures could reduce snowpack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the executive order established targets for total GHG emissions which include reducing GHG emissions to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The executive order also directed the secretary of the California Environmental Protection Agency to coordinate a multiagency effort to reduce GHG emissions to the target levels. The secretary will submit biannual reports to the governor and legislature describing progress made toward reaching the emission targets; impacts of global warming on California's resources; and mitigation and adaptation plans to combat impacts of global warming.

To comply with the executive order, the Secretary of the California Environmental Protection Agency created the California Climate Action Team which is made up of members from various state agencies and commissions. The California Climate Action Team released its first report in March 2006 of which proposed achieving the GHG emissions targets by building on voluntary



actions of California businesses and actions by local governments and communities along with continued implementation of state incentive and regulatory programs.

Executive Order S-13-08

Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008 which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The executive order directs OPR, in cooperation with the California Resources Agency (CRA), to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009. The order also directs the CRA to develop a state Climate Adaptation Strategy by June 30, 2009 and to convene an independent panel to complete the first California Sea Level Rise Assessment Report. The assessment report is required to be completed by December 1, 2010 and required to include the following four items:

1. Project the relative sea level rise specific to California by taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;
2. Identify the range of uncertainty in selected sea level rise projections;
3. Synthesize existing information on projected sea level rise impacts to state infrastructure (e.g., roads, public facilities, beaches), natural areas, and coastal and marine ecosystems; and
4. Discuss future research needs relating to sea level rise in California.

Executive Order S-1-07

Governor Schwarzenegger signed Executive Order S-1-07 in 2007 which proclaimed the transportation sector as the main source of GHG emissions in California. The executive order proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The executive order also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

In particular, the executive order established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the “life-cycle carbon intensity” of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (*State Alternative Fuels Plan* adopted by CEC on December 24, 2007) and was submitted to ARB for consideration as an “early action” item under AB 32. The ARB adopted the LCFS on April 23, 2009.

Local Greenhouse Gas Regulations

Bay Area Air Quality Management District Climate Protection Program

The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.



D. THRESHOLDS OF SIGNIFICANCE JUSTIFICATION



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

California Environmental Quality Act Guidelines Update

Thresholds of Significance

June 2, 2010



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Bay Area Air Quality Management District

Air Quality CEQA Thresholds of Significance

1. INTRODUCTION

Bay Area Air Quality Management District (BAAQMD or Air District) staff analyzed various options for California Environmental Quality Act (CEQA) air quality thresholds of significance for use within BAAQMD's jurisdiction. The analysis and evaluation undertaken by Air District staff is documented in the *Revised Draft Options and Justification Report – California Environmental Quality Act Thresholds of Significance* (Draft Options Report) (BAAQMD October 2009).

Air District staff hosted public workshops in February, April, September and October 2009, and April 2010 at several locations around the Bay Area. Air District staff also hosted additional workshops in each of the nine Bay Area counties specifically designed for, and to solicit input from, local agency staff. In addition, Air District staff met with regional stakeholder groups to discuss and receive input on the threshold options being evaluated. Throughout the course of the public workshops and stakeholder meetings Air District staff received many comments on the various options under consideration. Based on comments received and additional staff analysis, the threshold options and staff-recommended thresholds were further refined. The culmination of this nearly year and a half-long effort was presented in the Proposed Thresholds of Significance Report published on November 2, 2009 as the Air District staff's proposed air quality thresholds of significance.

The Air District Board of Directors (Board) held public hearings on November 18 and December 2, 2009 and January 6, 2010, to receive comments on staff's Proposed Thresholds of Significance (November 2, 2009; revised December 7, 2009). After public testimony and Board deliberations, the Board requested staff to present additional options for risk and hazard thresholds for Board consideration. This Report includes risks and hazards threshold options, as requested by the Board, in addition to staff's previously recommended thresholds of significance. The thresholds presented herein, adopted by the Air District Board of Directors, are intended to replace all of the Air District's currently recommended thresholds. The air quality thresholds of significance, and Board-requested risk and hazard threshold options, are provided in Table 1 at the end of this introduction.

1.1. BAAQMD/CEQA REGULATORY AUTHORITY

The BAAQMD has direct and indirect regulatory authority over sources of air pollution in the San Francisco Bay Area Air Basin (SFBAAB). CEQA requires that public agencies consider the potential adverse environmental impacts of any project that a public agency proposes to carry out, fund or approve. CEQA requires that a lead agency prepare an Environmental Impact Report (EIR) whenever it can be fairly argued (the "fair argument" standard), based on substantial evidence,⁷ that a project may have a significant effect⁸ on the environment, even if there is

⁷ "Substantial evidence" includes facts, reasonable assumptions predicated upon facts, or expert opinions supported by facts, but does not include argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate



substantial evidence to the contrary (CEQA Guidelines §15064). CEQA requires that the lead agency review not only a project's direct effects on the environment, but also the cumulative impacts of a project and other projects causing related impacts. When the incremental effect of a project is cumulatively considerable, the lead agency must discuss the cumulative impacts in an EIR. (CEQA Guidelines §15064).

The "fair argument" standard refers to whether a fair argument can be made that a project may have a significant effect on the environment (*No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 84). The fair argument standard is generally considered a low threshold requirement for preparation of an EIR. The legal standards reflect a preference for requiring preparation of an EIR and for "resolving doubts in favor of environmental review." *Meija v. City of Los Angeles* (2005) 130 Cal. App. 4th 322, 332. "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." (CEQA Guidelines §15064(b)).

In determining whether a project may have a significant effect on the environment, CEQA Guidelines Section 15064.7 provides that lead agencies may adopt and/or apply "thresholds of significance." A threshold of significance is "an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant" (CEQA Guidelines §15064.7).

While thresholds of significance give rise to a presumption of insignificance, thresholds are not conclusive, and do not excuse a public agency of the duty to consider evidence that a significant effect may occur under the fair argument standard. *Meija*, 130 Cal. App. 4th at 342. "A public agency cannot apply a threshold of significance or regulatory standard 'in a way that forecloses the consideration of any other substantial evidence showing there may be a significant effect.'" *Id.* This means that if a public agency is presented with factual information or other substantial evidence establishing a fair argument that a project may have a significant effect on the environment, the agency must prepare an EIR to study those impacts even if the project's impacts fall below the applicable threshold of significance.

Thresholds of significance must be supported by substantial evidence. This Report provides the substantial evidence in support of the thresholds of significance developed by the BAAQMD. If adopted by the BAAQMD Board of Directors, the Air District will recommend that lead agencies within the nine counties of the BAAQMD's jurisdiction use the thresholds of significance in this Report when considering the air quality impacts of projects under their consideration.

1.2. JUSTIFICATION FOR UPDATING CEQA THRESHOLDS

Any analysis of environmental impacts under CEQA includes an assessment of the nature and extent of each impact expected to result from the project to determine whether the impact will be treated as significant or less than significant. CEQA gives lead agencies discretion whether to classify a particular environmental impact as significant. Ultimately, formulation of a standard of significance requires the lead agency to make a policy judgment about where the line should be drawn distinguishing adverse impacts it considers significant from those that are not deemed significant. This judgment must, however, be based on scientific information and other factual data to the extent possible (CEQA Guidelines §15064(b)).

or erroneous, or evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment. Cal. Pub. Res. C. §21080(c); see also CEQA Guidelines §15384.

⁸ A "significant effect" on the environment is defined as a "substantial, or potentially substantial, adverse change in the environment." Cal. Pub. Res. C. §21068; see also CEQA Guidelines §15382.



In the sense that advances in science provide new or refined factual data, combined with advances in technology and the gradual improvement or degradation of an environmental resource, the point where an environmental effect is considered significant is fluid over time. Other factors influencing this fluidity include new or revised regulations and standards, and emerging, new areas of concern.

In the ten years since BAAQMD last reviewed its recommended CEQA thresholds of significance for air quality, there have been tremendous changes that affect the quality and management of the air resources in the Bay Area. Traditional criteria air pollutant ambient air quality standards, at both the state and federal levels, have become increasingly more stringent. A new criteria air pollutant standard for fine particulate matter less than 2.5 microns in diameter (PM_{2.5}) has been added to federal and state ambient air quality standards. We have found, through technical advances in impact assessment, that toxic air contaminants are not only worse than previously thought from a health perspective, but that certain communities experience high levels of toxic air contaminants, giving rise to new regulations and programs to reduce the significantly elevated levels of ambient toxic air contaminant concentrations in the Bay Area.

In response to the elevated levels of toxic air contaminants in some Bay Area communities, the Air District created the Community Air Risk Evaluation (CARE) Program. Phase 1 of the BAAQMD's CARE program compiled and analyzed a regional emissions inventory of toxic air contaminants (TACs), including emissions from stationary sources, area sources, and on-road and off-road mobile sources. Phase 2 of the CARE Program conducted regional computer modeling of selected TAC species, species which collectively posed the greatest risk to Bay Area residents. In both Phases 1 and 2, demographic data were combined with estimates of TAC emissions or concentrations to identify communities that are disproportionately impacted from high concentrations of TACs. Bay Area Public Health Officers, in discussions with Air District staff and in comments to the Air District's Advisory Council (February 11, 2009, Advisory Council Meeting on Air Quality and Public Health), have recommended that PM_{2.5}, in addition to TACs, be considered in assessments of community-scale impacts of air pollution.

Another significant issue that affects the quality of life for Bay Area residents is the growing concern with global climate change. In just the past few years, estimates of the global atmospheric temperature and greenhouse gas concentration limits needed to stabilize climate change have been adjusted downward and the impacts of greenhouse gas emissions considered more dire. Previous scientific assessments assumed that limiting global temperature rise to 2-3°C above pre-industrial levels would stabilize greenhouse gas concentrations in the range of 450-550 parts per million (ppm) of carbon dioxide-equivalent (CO_{2e}). Now the science indicates that a temperature rise of 2°C would not prevent dangerous interference with the climate system. Recent scientific assessments suggest that global temperature rise should be kept below 2°C by stabilizing greenhouse gas concentrations below 350 ppm CO_{2e}, a significant reduction from the current level of 385 ppm CO_{2e}.

For the reasons stated above, and to further the goals of other District programs such as encouraging transit-oriented and infill development, BAAQMD has undertaken an effort to review all of its currently-recommended CEQA thresholds, revise them as appropriate, and develop new thresholds where appropriate. The overall goal of this effort is to develop CEQA significance criteria that ensure new development implements appropriate and feasible emission reduction measures to mitigate significant air quality impacts. The Air District's recommended CEQA significance thresholds have been vetted through a public review process and will be presented to the BAAQMD Board of Directors for adoption.



Table D-2 – Air Quality CEQA Thresholds of Significance			
Pollutant	Construction-Related	Operational-Related	
Project-Level			
Criteria Air Pollutants and Precursors (Regional)	Average Daily Emissions (lb/day)	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82 (exhaust only)	82	15
PM _{2.5}	54 (exhaust only)	54	10
PM ₁₀ /PM _{2.5} (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
GHGs Projects other than Stationary Sources	None	Compliance with Qualified Greenhouse Gas Reduction Strategy OR 1,100 MT of CO ₂ e/yr OR 4.6 MT CO ₂ e/SP/yr (residents + employees)	
GHGs Stationary Sources	None	10,000 MT/yr	
Risks and Hazards – New Source (All Areas) (Individual Project) <u>Staff Proposal</u>	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor	



Table D-2 – Air Quality CEQA Thresholds of Significance		
Pollutant	Construction-Related	Operational-Related
<p>Risks and Hazards – New Receptor (All Areas) (Individual Project)</p> <p><u>Staff Proposal</u></p>	<p>Same as Operational Thresholds*</p>	<p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM_{2.5} increase: > 0.3 µg/m³ annual average</p> <p><u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor</p>
<p>Risks and Hazards (Individual Project)</p> <p><u>Tiered Thresholds Option</u></p>	<p>Same as Operational Thresholds*</p>	<p><u>Impacted Communities: Siting a New Source</u></p> <p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >5.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM_{2.5} increase: > 0.2 µg/m³ annual average</p> <p><u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor</p>
<p>Risks and Hazards (Individual Project)</p> <p><u>Tiered Thresholds Option</u> (Continued)</p>	<p>Same as Operational Thresholds*</p>	<p><u>Impacted Communities: Siting a New Receptor</u> <u>All Other Areas: Siting a New Source or Receptor</u></p> <p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM_{2.5} increase: > 0.3 µg/m³ annual average</p> <p><u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor</p>



Table D-2 – Air Quality CEQA Thresholds of Significance

Pollutant	Construction-Related	Operational-Related
Risks and Hazards – New Source (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM _{2.5} : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Receptor (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM _{2.5} : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant
Odors	None	Complaint History—Five confirmed complaints per year averaged over three years
Plan-Level		
Criteria Air Pollutants and Precursors	None	<ol style="list-style-type: none"> 1. Consistency with Current Air Quality Plan control measures 2. Projected VMT or vehicle trip increase is less than or equal to projected population increase



Table D-2 – Air Quality CEQA Thresholds of Significance		
Pollutant	Construction-Related	Operational-Related
GHGs	None	Compliance with Qualified Greenhouse Gas Reduction Strategy (or similar criteria included in a General Plan) OR 6.6 MT CO ₂ e/ SP/yr (residents + employees)
Risks and Hazards	None	1. Overlay zones around existing and planned sources of TACs (including adopted Risk Reduction Plan areas) 2. Overlay zones of at least 500 feet (or Air District-approved modeled distance) from all freeways and high volume roadways
Odors	None	Identify the location of existing and planned sources of odors
Accidental Release of Acutely Hazardous Air Pollutants	None	None
Regional Plans (Transportation and Air Quality Plans)		
GHGs, Criteria Air Pollutants and Precursors, and Toxic Air Contaminants	None	No net increase in emissions
<p>Notes: CO = carbon monoxide; CO₂e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SO₂ = sulfur dioxide; SP = service population; TACs = toxic air contaminants; TBP = toxic best practices; tons/day = tons per day; tpy = tons per year; yr= year.</p> <p>* Note: The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.</p>		

2. GREENHOUSE GAS THRESHOLDS

BAAQMD does not currently have an adopted threshold of significance for GHG emissions. BAAQMD currently recommends that lead agencies quantify GHG emissions resulting from new development and apply all feasible mitigation measures to lessen the potentially significant adverse impacts. One of the primary objectives in updating the current CEQA Guidelines is to identify a GHG significance threshold, analytical methodologies, and mitigation measures to ensure new land use development meets its fair share of the emission reductions needed to address the cumulative environmental impact from GHG emissions. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. As reviewed herein, climate change impacts include an increase in extreme heat days, higher ambient concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental



impacts. No single land use project could generate enough GHG emissions to noticeably change the global average temperature. The combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

2.1. THRESHOLDS OF SIGNIFICANCE

Project Type	Thresholds
<p>Projects other than Stationary Sources</p>	<p>Compliance with Qualified Greenhouse Gas Reduction Strategy OR 1,100 MT of CO₂e/yr OR 4.6 MT CO₂e/SP/yr (residents + employees)</p>
<p>Stationary Sources</p>	<p>10,000 MT of CO₂e/yr</p>
<p>Plans</p>	<p>Compliance with Qualified Greenhouse Gas Reduction Strategy (or similar criteria included in a General Plan) OR 6.6 MT CO₂e/SP/yr (residents + employees)</p>
<p>Regional Plans (Transportation and Air Quality Plans)</p>	<p>No net increase in GHG emissions</p>

2.2. JUSTIFICATION AND SUBSTANTIAL EVIDENCE SUPPORTING THRESHOLDS

BAAQMD’s approach to developing a threshold of significance for GHG emissions is to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. If a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. If mitigation can be applied to lessen the emissions such that the project meets its share of emission reductions needed to address the cumulative impact, the project would normally be considered less than significant.

As explained in the District’s *Revised Draft Options and Justifications Report* (BAAQMD 2009), there are several types of thresholds that may be supported by substantial evidence and be consistent with existing California legislation and policy to reduce statewide GHG emissions. In determining which thresholds to recommend, Staff studied numerous options, relying on reasonable, environmentally conservative assumptions on growth in the land use sector, predicted emissions reductions from statewide regulatory measures and resulting emissions inventories, and the efficacies of GHG mitigation measures. The thresholds recommended herein were chosen based on the substantial evidence that such thresholds represent quantitative and/or qualitative levels of GHG emissions, compliance with which means that the environmental impact of the GHG emissions will normally not be cumulatively considerable under CEQA. Compliance with such thresholds will be part of the solution to the cumulative GHG emissions problem, rather than hinder the state’s ability to meet its goals of reduced statewide GHG emissions. Staff notes that it does not believe there is only one threshold for GHG emissions that can be supported by substantial evidence.



GHG CEQA significance thresholds recommended herein are intended to serve as interim levels during the implementation of the AB 32 Scoping Plan and SB 375, which will occur over time. Until AB 32 has been fully implemented in terms of adopted regulations, incentives, and programs and until SB 375 required plans have been fully adopted, or the California Air Resources Board (ARB) adopts a recommended threshold, the BAAQMD recommends that local agencies in the Bay Area apply the GHG thresholds recommended herein.

If left unchecked, GHG emissions from new land use development in California will result in a cumulatively considerable amount of GHG emissions and a substantial conflict with the State's ability to meet the goals within AB 32. Thus, BAAQMD proposes to adopt interim GHG thresholds for CEQA analysis, which can be used by lead agencies within the Bay Area. This would help lead agencies navigate this dynamic regulatory and technological environment where the field of analysis has remained wide open and inconsistent. BAAQMD's framework for developing a GHG threshold for land development projects that is based on policy and substantial evidence follows.

2.2.1. Scientific and Regulatory Justification

Climate Science Overview

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007a).

According to Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC), "Avoiding Dangerous Climate Change" means: "*stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*" Dangerous climate change defined in the UNFCCC is based on several key indicators including the potential for severe degradation of coral reef systems, disintegration of the West Antarctic Ice Sheet, and shut down of the large-scale, salinity- and thermally-driven circulation of the oceans. (UNFCCC 2009). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 ppm to 379 ppm in 2005 (IPCC 2007a). "Avoiding dangerous climate change" is generally understood to be achieved by stabilizing global average temperatures between 2 and 2.4°C above pre-industrial levels. In order to limit temperature increases to this level, ambient global CO₂ concentrations must stabilize between 350 and 400 ppm (IPCC 2007b).

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed Assembly Bill 32, the California Global Warming Solutions Act of 2006, which set the 2020 greenhouse gas emissions reduction goal into law. AB 32 finds and declares that "Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020, and establishes



regulatory, reporting, voluntary, and market mechanisms to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

In December of 2008, ARB adopted its *Climate Change Scoping Plan (Scoping Plan)*, which is the State's plan to achieve GHG reductions in California, as required by AB 32 (ARB 2008). The Scoping Plan contains strategies California will implement to achieve a reduction of 169 MMT CO₂e emissions, or approximately 28 percent from the state's projected 2020 emission level of 596 MMT of CO₂e under a business-as-usual scenario (this is a reduction of 42 MMT of CO₂e, or almost 10 percent, from 2002-2004 average emissions), so that the state can return to 1990 emission levels, as required by AB 32.

While the Scoping Plan establishes the policy intent to control numerous GHG sources through regulatory, incentive, and market means, given the early phase of implementation and the level of control that local CEQA lead agencies have over numerous GHG sources, CEQA is an important and supporting tool in achieving GHG reductions overall in compliance with AB 32. In this spirit, BAAQMD is considering the adoption of thresholds of significance for GHG emissions for stationary source and land use development projects.

Senate Bill 375

Senate Bill (SB) 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years, but can be updated every four years if advancements in emission technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for State funding programmed after January 1, 2012. New provisions of CEQA incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

The revised District CEQA Guidelines includes methodology consistent with the recently updated State CEQA Guidelines, which provides that certain residential and mixed use projects, and transit priority projects consistent with an applicable SCS or APS need not analyze GHG impacts from cars and light duty trucks (CEQA Guidelines §15183.5(c)).

2.2.2. Project-Level GHG Thresholds

Staff recommends setting GHG significance thresholds based on AB 32 GHG emission reduction goals while taking into consideration emission reduction strategies outlined in ARB's Scoping Plan. Staff proposes two quantitative thresholds for land use projects: a bright line threshold based on a "gap" analysis and an efficiency threshold based on emission levels required to be met in order to achieve AB 32 goals.

Staff also proposes one qualitative threshold for land use projects: if a project complies with a Qualified Greenhouse Gas Reduction Strategy (as defined in Section 2.3.4 below) that addresses the project it would be considered less than significant. As explained in detail in Section 2.3.4 below, compliance with a Qualified Greenhouse Gas Reduction Strategy (or similar adopted policies, ordinances and programs), would provide the evidentiary basis for making CEQA findings that development consistent with the plan would result in feasible, measurable, and verifiable GHG reductions consistent with broad state goals such that projects approved under

qualified Greenhouse Gas Reduction Strategies or equivalent demonstrations would achieve their fair share of GHG emission reductions.

Land Use Projects “Gap-Based” Threshold

Staff took eight steps in developing this threshold approach, which are summarized here and detailed in the sections that follow. It should be noted that the “gap-based approach” used for threshold development is a conservative approach that focuses on a limited set of state mandates that appear to have the greatest potential to reduce land use development-related GHG emissions at the time of this writing. It is also important to note that over time, as the effectiveness of the State’s implementation of AB 32 (and SB 375) progresses, BAAQMD will need to reconsider the extent of GHG reductions needed over and above those from the implementation thereof for the discretionary approval of land use development projects. Although there is an inherent amount of uncertainty in the estimated capture rates (i.e., frequency at which project-generated emissions would exceed a threshold and would be subject to mitigation under CEQA) and the aggregate emission reductions used in the gap analysis, they are based on BAAQMD’s expertise, the best available data, and use conservative assumptions for the amount of emission reductions from legislation in derivation of the gap (e.g., only adopted legislation was relied upon). This approach is intended to attribute an appropriate share of GHG emission reductions necessary to reach AB 32 goals to new land use development projects in BAAQMD’s jurisdiction that are evaluated pursuant to CEQA.

Step 1 Estimate from ARB’s statewide GHG emissions inventory the growth in emissions between 1990 and 2020 attributable to “land use-driven” sectors of the emission inventory as defined by OPR’s guidance document (*CEQA and Climate Change*). Land use-driven emission sectors include Transportation (On-Road Passenger Vehicles; On-Road Heavy Duty), Electric Power (Electricity; Cogeneration), Commercial and Residential (Residential Fuel Use; Commercial Fuel Use) and Recycling and Waste (Domestic Waste Water Treatment).

Result: 1990 GHG emissions were 295.53 MMT CO₂e/yr and projected 2020 business-as-usual GHG emissions would be 400.22 MMT CO₂e/yr; thus a 26.2 percent reduction from statewide land use-driven GHG emissions would be necessary to meet the AB 32 goal of returning to 1990 emission levels by 2020. (See Table 2)

Step 2 Estimate the anticipated GHG emission reductions affecting the same land use-driven emissions inventory sectors associated with adopted statewide regulations identified in the AB 32 Scoping Plan.

Result: Estimated a 23.9 percent reduction can be expected in the land use-driven GHG emissions inventory from adopted Scoping Plan regulations, including AB 1493 (Pavley), LCFS, Heavy/Medium Duty Efficiency, Passenger Vehicle Efficiency, Energy-Efficiency Measures, Renewable Portfolio Standard, and Solar Roofs. (See Table 3)

Step 3 Determine any short fall or “gap” between the 2020 statewide emission inventory estimates and the anticipated emission reductions from adopted Scoping Plan regulations. This “gap” represents additional GHG emission reductions needed statewide from the land use-driven emissions inventory sectors, which represents new land use development’s share of the emission reductions needed to meet statewide GHG emission reduction goals.

Result: With the 23.9 percent reductions from AB 32 Scoping Measures, there is a “gap” of 2.3 percent in necessary additional GHG emissions reductions to meet AB 32



goals of a 26.2 percent reduction from statewide land use-driven GHG emissions to return to 1990 levels in 2020. (See Table 2)

- Step 4 Determine the percent reduction this “gap” represents in the “land use-driven” emissions inventory sectors from BAAQMD’s 2020 GHG emissions inventory. Identify the mass of emission reductions needed in the SFBAAB from land use-driven emissions inventory sectors.

Result: Estimated that a 2.3 percent reduction in BAAQMD’s projected 2020 emissions projections requires emissions reductions of 1.6 MMT CO₂e/yr from the land use-driven sectors. (See Table 4)

- Step 5 Assess BAAQMD’s historical CEQA database (2001-2008) to determine the frequency distribution trend of project sizes and types that have been subject to CEQA over the past several years.

Result: Determined historical patterns of residential, commercial and industrial development by ranges of average sizes of each development type. Results were used in Step 6 below to distribute anticipated Bay Area growth among different future project types and sizes.

- Step 6 Forecast new land use development for the Bay Area using DOF/EDD population and employment projections and distribute the anticipated growth into appropriate land use types and sizes needed to accommodate the anticipated growth (based on the trend analysis in Step 5 above). Translate the land use development projections into land use categories consistent with those contained in the Urban Emissions Model (URBEMIS).

Result: Based on population and employment projections and the trend analysis from Step 5 above, forecasted approximately 4,000 new development projects, averaging about 400 projects per year through 2020 in the Bay Area.

- Step 7 Estimate the amount of GHG emissions from each land use development project type and size using URBEMIS and post-model manual calculation methods (for emissions not included in URBEMIS). Determine the amount of GHG emissions that can reasonably and feasibly be reduced through currently available mitigation measures (“mitigation effectiveness”) for future land use development projects subject to CEQA (based on land use development projections and frequency distribution from Step 6 above).

Result: Based on the information available and on sample URBEMIS calculations, found that mitigation effectiveness of between 25 and 30 percent is feasible.

- Step 8 Conduct a sensitivity analysis of the numeric GHG mass emissions threshold needed to achieve the desired emissions reduction (i.e., “gap”) determined in Step 4. This mass emission GHG threshold is that which would be needed to achieve the emission reductions necessary by 2020 to meet the Bay Area’s share of the statewide “gap” needed from the land use-driven emissions inventory sectors.

Result: The results of the sensitivity analysis conducted in Step 8 found that reductions between about 125,000 MT/yr (an aggregate of 1.3 MMT in 2020) and over 200,000 MT/yr (an aggregate of over 2.0 MMT in 2020) were achievable and feasible. A mass emissions threshold of 1,100 MT of CO₂e/yr would result in approximately 59 percent of all projects being above the significance threshold (e.g., this is approximately the operational GHG emissions that would be associated with a 60 residential unit



subdivision) and must implement feasible mitigation measures to meet CEQA requirements. With an estimated 26 percent mitigation effectiveness, the 1,100 MT threshold would achieve 1.6 MMT CO₂e/yr in GHG emissions reductions.

Detailed Basis and Analysis

Derivation of Greenhouse Gas Reduction Goal

To meet the target emissions limit established in AB 32 (equivalent to levels in 1990), total GHG emissions would need to be reduced by approximately 28 percent from projected 2020 forecasts (ARB 2009a). The AB 32 Scoping Plan is ARB's plan for meeting this mandate (ARB 2008). While the Scoping Plan does not specifically identify GHG emission reductions from the CEQA process for meeting AB 32 derived emission limits, the scoping plan acknowledges that "other strategies to mitigate climate change . . . should also be explored." The Scoping Plan also acknowledges that "Some of the measures in the plan may deliver more emission reductions than we expect; others less . . . and new ideas and strategies will emerge." In addition, climate change is considered a significant environmental issue and, therefore, warrants consideration under CEQA. SB 97 represents the State Legislature's confirmation of this fact, and it directed the Governor's Office of Planning and Research (OPR) to develop CEQA Guidelines for evaluation of GHG emissions impacts and recommend mitigation strategies. In response, OPR released the *Technical Advisory: CEQA and Climate Change* (OPR 2008), and proposed revisions to the State CEQA guidelines (April 14, 2009) for consideration of GHG emissions. The California Natural Resources Agency adopted the proposed State CEQA Guidelines revisions on December 30, 2009 and the revisions were effective beginning March 18, 2010. It is known that new land use development must also do its fair share toward achieving AB 32 goals (or, at a minimum, should not hinder the State's progress toward the mandated emission reductions).

Foreseeable Scoping Plan Measures Emission Reductions and Remaining "Gap"

Step 1 of the Gap Analysis entailed estimating from ARB's statewide GHG inventory the growth in emissions between 1990 and 2020 attributable to land use driven sectors of the emissions inventory. As stated above, to meet the requirements set forth in AB 32 (i.e., achieve California's 1990-equivalent GHG emissions levels by 2020) California would need to achieve an approximate 28 percent reduction in emissions across all sectors of the GHG emissions inventory compared with 2020 projections. However, to meet the AB 32 reduction goals in the emissions sectors that are related to land use development (e.g., on-road passenger and heavy-duty motor vehicles, commercial and residential area sources [i.e., natural gas], electricity generation/consumption, wastewater treatment, and water distribution/consumption), staff determined that California would need to achieve an approximate 26 percent reduction in GHG emissions from these land use-driven sectors (ARB 2009a) by 2020 to return to 1990 land use emission levels.

Next, in Step 2 of the Gap Analysis, Staff determined the GHG emission reductions within the land use-driven sectors that are anticipated to occur from implementation of the Scoping Plan measures statewide, which are summarized in Table 2 and described below. Since the GHG emission reductions anticipated with the Scoping Plan were not accounted for in ARB's or BAAQMD's 2020 GHG emissions inventory forecasts (i.e., business as usual), an adjustment was made to include (i.e., give credit for) GHG emission reductions associated with key Scoping Plan measures, such as the Renewable Portfolio Standard, improvements in energy efficiency through periodic updates to Title 24, AB 1493 (Pavley) (which recently received a federal waiver to allow it to be enacted in law), the Low Carbon Fuel Standard (LCFS), and other measures. With reductions from these State regulations (Scoping Plan measures) taken into consideration and accounting for an estimated 23.9 percent reduction in GHG emissions, in Step 3 of the Gap Analysis Staff determined that the Bay Area would still need to achieve an additional 2.3 percent reduction from projected 2020 GHG emissions to meet the 1990 GHG emissions goal from the



land-use driven sectors. This necessary 2.3 percent reduction in projected GHG emissions from the land use sector is the “gap” the Bay Area needs to fill to do its share to meet the AB 32 goals. Refer to the following explanation and Tables 2 through 4 for data used in this analysis.

Because the transportation sector is the largest emissions sector of the state’s GHG emissions inventory, it is aggressively targeted in early actions and other priority actions in the Scoping Plan including measures concerning gas mileage (Pavley), fuel carbon intensity (LCFS) and vehicle efficiency measures.

**Table D-3 – California 1990, 2002-2004, and 2020 Land Use Sector GHG¹
(MMT CO₂e/yr)**

Sector	1990 Emissions	2002-2004 Average	2020 BAU Emissions Projections	% of 2020 Total
Transportation	137.98	168.66	209.06	52%
On-Road Passenger Vehicles	108.95	133.95	160.78	40%
On-Road Heavy Duty	29.03	34.69	48.28	12%
Electric Power	110.63	110.04	140.24	35%
Electricity	95.39	88.97	107.40	27%
Cogeneration ²	15.24	21.07	32.84	8%
Commercial and Residential	44.09	40.96	46.79	12%
Residential Fuel Use	29.66	28.52	32.10	8%
Commercial Fuel Use	14.43	12.45	14.63	4%
Recycling and Waste¹	2.83	3.39	4.19	1%
Domestic Wastewater Treatment	2.83	3.39	4.19	1%
TOTAL GROSS EMISSIONS	295.53	323.05	400.22	
% Reduction Goal from Statewide land use driven sectors (from 2020 levels to reach 1990 levels in these emission inventory sectors)			26.2%	
% Reduction from AB32 Scoping Plan measures applied to land use sectors (see Table 3)			-23.9%	
% Reduction needed statewide beyond Scoping Plan measures (Gap)			2.3%	
Notes: MMT CO ₂ e /yr = million metric tons of carbon dioxide equivalent emissions per year.				
¹ Landfills not included. See text.				
² Cogeneration included due to many different applications for electricity, in some cases provides substantial power for grid use, and because electricity use served by cogeneration is often amenable to efficiency requirements of local land use authorities.				
Sources: Data compiled by EDAW and ICF Jones & Stokes from ARB data.				

Pavley Regulations. The AB 32 Scoping Plan assigns an approximate 20 percent reduction in emissions from passenger vehicles associated with the implementation of AB 1493. The AB 32 Scoping Plan also notes that “AB 32 specifically states that if the Pavley regulations do not remain in effect, ARB shall implement alternative regulations to control mobile sources to achieve



equivalent or greater reductions of greenhouse gas emissions (HSC §38590).” Thus, it is reasonable to assume full implementation of AB 1493 standards, or equivalent programs that would be implemented by ARB. Furthermore, on April 1, 2010, U.S. EPA and the Department of Transportation’s National Highway Safety Administration (NHTSA) announced a joint final rule establishing a national program that will dramatically reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States after 2011. Under this national program, automobile manufacturers will be able to build a single light-duty national fleet that satisfies all requirements under both the national program and the standards of California and other states. Nonetheless, BAAQMD may need to revisit this methodology as the federal standards come on line to ensure that vehicle standards are as aggressive as contemplated in development of this threshold.

Affected Emissions Source	California Legislation	% Reduction from 2020 GHG inventory	End Use Sector (% of Bay Area LU Inventory)	Scaled % Emissions Reduction (credit)
Mobile	AB 1493 (Pavley)	19.7%	On road passenger/light truck transportation (45%)	8.9%
	LCFS	7.2%	On road passenger/light truck transportation (45%)	3.2%
	LCFS	7.2%	On road Heavy/Medium Duty Transportation (5%)	0.4%
	Heavy/Medium Duty Efficiency	2.9%	On road Heavy/Medium Duty Transportation (5%)	0.2%
	Passenger Vehicle Efficiency	2.8%	On road passenger/light truck transportation (45%)	1.3%
Area	Energy-Efficiency Measures	9.5%	Natural gas (Residential, 10%)	1.0%
			Natural gas (Non-residential, 13%)	1.2%
Indirect	Renewable Portfolio Standard	21.0%	Electricity (excluding cogen) (17%)	3.5%
	Energy-Efficiency Measures	15.7%	Electricity (26%)	4.0%
	Solar Roofs	1.5%	Electricity (excluding cogen) (17%)	0.2%
Total credits given to land use-driven emission inventory sectors from Scoping Plan measures				23.9%
Notes: AB = Assembly Bill; LCFS = Low Carbon Fuel Standard; SB = Senate Bill; RPS = Renewable Portfolio Standard Please refer to Appendix D for detailed calculations. Sources: Data compiled by ICF Jones & Stokes.				

LCFS. According to the adopted LCFS rule (CARB, April 2009), the LCFS is expected to result in approximately 10 percent reduction in the carbon intensity of transportation fuels. However, a



portion of the emission reductions required from the LCFS would be achieved over the life cycle of transportation fuel production rather than from mobile-source emission factors. Based on CARB's estimate of nearly 16 MMT reductions in on-road emissions from implementation of the LCFS and comparison to the statewide on-road emissions sector, the LCFS is assumed to result in a 7.2 percent reduction compared to 2020 BAU conditions (CARB 2009e).

Sector	1990 Emissions	2007 Emissions	2020 Emissions Projections	% of 2020 Total ²
Transportation	26.1	30.8	35.7	50%
On-Road Passenger Vehicles	23.0	27.5	32.0	
On-Road Heavy Duty	3.1	3.3	3.7	
Electric Power	25.1	15.2	18.2	26%
Electricity	16.5	9.9	11.8	
Cogeneration	8.6	5.3	6.4	
Commercial and Residential	8.9	15.0	16.8	24%
Residential Fuel Use	5.8	7.0	7.5	
Commercial Fuel Use	3.1	8.0	9.3	
Recycling and Waste¹	0.2	0.4	0.4	1%
Domestic Waste Water Treatment	0.2	0.4	0.4	
TOTAL GROSS EMISSIONS	60.3	61.4	71.1	
SFBAAB's "Fair Share" % Reduction (from 2020 levels to reach 1990 levels) with AB-32 Reductions (from Table 3)			2.3%	
SFBAAB's Equivalent Mass Emissions Land Use Reduction Target at 2020 (MMT CO ₂ e/yr)			1.6	
Notes: MMT CO ₂ e /yr = million metric tons of carbon dioxide equivalent emissions per year; SFBAAB = San Francisco Bay Area Air Basin.				
¹ Landfills not included.				
² Percentages do not sum exactly to 100% in table due to rounding.				
Please refer to Appendix D for detailed calculations.				
Sources: Data compiled by EDAW 2009, ICF Jones & Stokes 2009, BAAQMD 2008.				

Renewable Portfolio Standard, Energy Efficiency and Solar Roofs. Energy efficiency and renewable energy measures from the Scoping Plan were also included in the gap analysis. The Renewable Portfolio Standard (rules) will require the renewable energy portion of the retail electricity portfolio to be 33 percent in 2020. For PG&E, the dominant electricity provider in the Basin, approximately 12 percent of their current portfolio qualifies under the RPS rules and thus the gain by 2020 would be approximately 21 percent. The Scoping Plan also estimates that energy efficiency gains with periodic improvement in building and appliance energy standards and incentives will reach 10 to 15 percent for natural gas and electricity respectively. The final



state measure included in this gap analysis is the solar roof initiative, which is estimated to result in reduction of the overall electricity inventory of 1.5 percent.

Landfill emissions are excluded from this analysis. While land use development does generate waste related to both construction and operations, the California Integrated Waste Management Board (CIWMB) has mandatory diversion requirements that will, in all probability, increase over time to promote waste reductions, reuse, and recycle. The Bay Area has relatively high levels of waste diversion and extensive recycling efforts. Further, ARB has established and proposes to increase methane capture requirements for all major landfills. Thus, at this time, landfill emissions associated with land use development waste generation is not included in the land use sector inventory used to develop this threshold approach.

Industrial stationary sources thresholds were developed separately from the land use threshold development using a market capture approach as described below. However, mobile source and area source emissions, as well as indirect electricity emissions that derive from industrial use are included in the land use inventory above as these particular activities fall within the influence of local land use authorities in terms of the affect on trip generation and energy efficiency.

AB 32 mandates reduction to 1990-equivalent GHG levels by 2020, with foreseeable emission reductions from State regulations and key Scoping Plan measures taken into account, were applied to the land use-driven emission sectors within the SFBAAB (i.e., those that are included in the quantification of emissions from a land use project pursuant to a CEQA analysis [on-road passenger vehicles, commercial and residential natural gas, commercial and residential electricity consumption, and domestic waste water treatment], as directed by OPR in the Technical Advisory: *Climate Change and CEQA* [OPR 2008]). This translates to a 2.3 percent gap in necessary GHG emission reductions by 2020 from these sectors.

Land Use Projects Bright Line Threshold

In Steps 4 and 5 of the gap analysis, Staff determined that applying a 2.3 percent reduction to these land use emissions sectors in the SFBAAB's GHG emissions inventory would result in an equivalent fair share of 1.6 million metric tons per year (MMT/yr) reductions in GHG emissions from new land use development. As additional regulations and legislation aimed at reducing GHG emissions from land use-related sectors become available in the future, the 1.6 MMT GHG emissions reduction goal may be revisited and recalculated by BAAQMD.

In order to derive the 1.6 MMT "gap," a projected development inventory for the next ten years in the SFBAAB was calculated (see Table 4 and *Revised Draft Options and Justifications Report* (BAAQMD 2009)). CO_{2e} emissions were modeled for projected development in the SFBAAB and compiled to estimate the associated GHG emissions inventory. The GHG (i.e., CO_{2e}) CEQA threshold level was adjusted for projected land use development that would occur within BAAQMD's jurisdiction over the period from 2010 through 2020.

Projects with emissions greater than the threshold would be required to mitigate to the threshold level or reduce project emissions by a percentage (mitigation effectiveness) deemed feasible by the Lead Agency under CEQA compared to a base year condition. The base year condition is defined by an equivalent size and character of project with annual emissions using the defaults in URBEMIS and the California Climate Action Registry's General Reporting Protocol for 2008. By this method, land use project mitigation subject to CEQA would help close the "gap" remaining after application of the key regulations and measures noted above supporting overall AB 32 goals.

This threshold takes into account Steps 1-8 of the gap analysis described above to arrive at a numerical mass emissions threshold. Various mass emissions significance threshold levels (i.e.,



bright lines) could be chosen based on the mitigation effectiveness and performance anticipated to be achieved per project to meet the aggregate emission reductions of 1.6 MMT needed in the SFBAAB by 2020(see Table 5 and *Revised Draft Options and Justifications Report* (BAAQMD 2009)). Staff recommends a 1,100 MT CO₂e per year threshold. Choosing a 1,100 MT mass emissions significance threshold level (equivalent to approximately 60 single-family units), would result in about 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development in the SFBAAB.

Project applicants and lead agencies could use readily available computer models to estimate a project’s GHG emissions, based on project specific attributes, to determine if they are above or below the bright line numeric threshold. With this threshold, projects that are above the threshold level, after consideration of emission-reducing characteristics of the project as proposed, would have to reduce their emissions to below the threshold to be considered less than significant.

Establishing a “bright line” to determine the significance of a project’s GHG emissions impact provides a level of certainty to lead agencies in determining if a project needs to reduce its GHG emissions through mitigation measures and when an EIR is required.

Table D-6 – Operational GHG Threshold Sensitivity Analysis

Option	Mitigation Effectiveness Assumptions		Mass Emission Threshold Level (MT CO ₂ e/yr)	% of Projects Captured (>threshold)	% of Emissions Captured (> threshold)	Emissions Reduction per year (MT/yr)	Aggregate Emissions Reduction (MMT) at 2020	Threshold Project Size Equivalent (single family dwelling units)
	Performance Standards Applied to All Projects with Emissions < Threshold Level	Mitigation Effectiveness Applied to Emissions > Threshold Level						
1A	N/A	30%	975	60%	93%	201,664	2.0	53
1A	N/A	25%	110	96%	100%	200,108	2.0	66
1A	N/A	30%	1,225	21%	67%	159,276	1.6	67
1A	N/A	26%	1,100	59%	92%	159,877	1.6	60
1A	N/A	30%	2,000	14%	61%	143,418	1.4	109
1A	N/A	25%	1,200	58%	92%	136,907	1.4	66
1A	N/A	30%	3,000	10%	56%	127,427	1.3	164
1A	N/A	25%	1,500	20%	67%	127,303	1.3	82
1B	26%	N/A	N/A	100%	100%	208,594	2.1	N/A ¹
1C	5%	30%	1,900	15%	62%	160,073	1.6	104
1C	10%	25%	1,250	21%	67%	159,555	1.6	68
1C	5%	30%	3,000	10%	56%	145,261	1.5	164
1C	10%	25%	2,000	4%	61%	151,410	1.5	109
1C	10%	30%	10,000	2%	33%	125,271	1.3	547

MMT = million metric tons per year; MT CO₂e/yr = metric tons of carbon dioxide equivalent emissions per year; MT/yr = metric tons per year; N/A = not applicable.

¹ Any project subject to CEQA would trigger this threshold.

Please refer to Appendix E for detailed calculations.

Source: Data modeled by ICF Jones & Stokes.



Land Use Projects Efficiency-Based Threshold

GHG efficiency metrics can also be utilized as thresholds to assess the GHG efficiency of a project on a per capita basis (residential only projects) or on a “service population” basis (the sum of the number of jobs and the number of residents provided by a project) such that the project will allow for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020). GHG efficiency thresholds can be determined by dividing the GHG emissions inventory goal (allowable emissions), by the estimated 2020 population and employment. This method allows highly efficient projects with higher mass emissions to meet the overall reduction goals of AB 32. Staff believes it is more appropriate to base the land use efficiency threshold on the service population metric for the land use-driven emission inventory. This approach is appropriate because the threshold can be applied evenly to all project types (residential or commercial/retail only and mixed use) and uses only the land use emissions inventory that is comprised of all land use projects. Staff will provide the methodology to calculate a project’s GHG emissions in the revised CEQA Guidelines, such as allowing infill projects up to a 50 percent or more reduction in daily vehicle trips if the reduction can be supported by close proximity to transit and support services, or a traffic study prepared for the project.

Table D-7 – California 2020 GHG Emissions, Population Projections and GHG Efficiency Thresholds - Land Use Inventory Sectors	
Land Use Sectors Greenhouse Gas Emissions Target	295,530,000
Population	44,135,923
Employment	20,194,661
California Service Population (Population + Employment)	64,330,584
AB 32 Goal GHG emissions (metric tons CO ₂ e)/SP ¹	4.6
Notes: AB = Assembly Bill; CO ₂ e = carbon dioxide equivalent; GHG = greenhouse gas; SP = service population.	
¹ Greenhouse gas efficiency levels were calculated using only the “land use-related” sectors of ARB’s emissions inventory.	
Please refer to Appendix D for detailed calculations.	
Sources: Data compiled by EDAW 2009, ARB 2009a, DOF 2009, EDD 2009, ICF Jones & Stokes 2009.	

Staff proposes a project-level efficiency threshold of 4.6 MT CO₂e/SP, the derivation of which is shown Table 6. This efficiency-based threshold reflects very GHG-efficient projects. As stated previously and below, staff anticipates that significance thresholds (rebuttable presumptions of significance at the project level) will function on an interim basis only until adequate programmatic approaches are in place at the city, county, and regional level that will allow the CEQA streamlining of individual projects. (See State CEQA Guidelines §15183.5 [“Tiering and Streamlining the Analysis of Greenhouse Gas Emissions”]).

2.2.3. Plan-Level GHG Thresholds

Staff proposes using a two step process for determining the significance of proposed plans and plan amendments for GHG. As a first step in assessing plan-level impacts, Staff is proposing that agencies that have adopted a qualified Greenhouse Gas Reduction Strategy (or have incorporated similar criteria in their general plan) and the general plan is consistent with the Greenhouse Gas Reduction Strategy, the general plan would be considered less than significant. In addition, as discussed above for project-level GHG impacts, Staff is proposing an efficiency threshold to assess plan-level impacts. Staff believes a programmatic approach to limiting GHG emissions is appropriate at the plan-level. Thus, as projects consistent with the Greenhouse Gas



Reduction Strategy are proposed, they may be able to tier off the plan and its environmental analysis.

GHG Efficiency Metrics for Plans

For local land use plans, a GHG-efficiency metric (e.g., GHG emissions per unit) would enable comparison of a proposed general plan to its alternatives and to determine if the proposed general plan meets AB 32 emission reduction goals.

AB 32 identifies local governments as essential partners in achieving California’s goal to reduce GHG emissions. Local governments have primary authority to plan, zone, approve, and permit how and where land is developed to accommodate population growth and the changing needs of their jurisdiction. ARB has developed the Local Government Operations Protocol and is developing a protocol to estimate community-wide GHG emissions. ARB encourages local governments to use these protocols to track progress in reducing GHG emissions. ARB encourages local governments to institutionalize the community’s strategy for reducing its carbon footprint in its general plan. SB 375 creates a process for regional integration of land development patterns and transportation infrastructure planning with the primary goal of reducing GHG emissions from the largest sector of the GHG emission inventory, light duty vehicles.

If the statewide AB 32 GHG emissions reduction context is established, GHG efficiency can be viewed independently from the jurisdiction in which the plan is located. Expressing projected 2020 mass of emissions from land use-related emissions sectors by comparison to a demographic unit (e.g., population and employment) provides evaluation of the GHG efficiency of a project in terms of what emissions are allowable while meeting AB 32 targets.

Two approaches were considered for efficiency metrics. The “service population” (SP) approach would consider efficiency in terms of the GHG emissions compared to the sum of the number of jobs and the number of residents at a point in time. The per capita option would consider efficiency in terms of GHG emissions per resident only. Staff recommends that the efficiency threshold for plans be based on all emission inventory sectors because, unlike land use projects, general plans comprise more than just land use related emissions (e.g. industrial). Further, Staff recommends that the plan threshold be based on the service population metric as general plans include a mix of residents and employees. The Service Population metric would allow decision makers to compare GHG efficiency of general plan alternatives that vary residential and non-residential development totals, encouraging GHG efficiency through improving jobs/housing balance. This approach would not give preference to communities that accommodate more residential (population-driven) land uses than non-residential (employment driven) land uses which could occur with the per capita approach.

A SP-based GHG efficiency metric (see Table 7) was derived from the emission rates at the State level that would accommodate projected population and employment growth under trend forecast conditions, and the emission rates needed to accommodate growth while allowing for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020).

Table D-8 – California 2020 GHG Emissions, Population Projections and GHG Efficiency Thresholds - All Inventory Sectors	
All Inventory Sectors Greenhouse Gas Emissions Target	426,500,000
Population	44,135,923
Employment	20,194,661
California Service Population (Population + Employment)	64,330,584


AB 32 Goal GHG emissions (metric tons CO₂e)/SP¹
6.6

 Notes: AB = Assembly Bill; CO₂e = carbon dioxide equivalent; GHG = greenhouse gas; SP = service population.

¹ Greenhouse gas efficiency levels were calculated using only the “land use-related” sectors of ARB’s emissions inventory.

Please refer to Appendix D for detailed calculations.

Sources: Data compiled by EDAW 2009, ARB 2009a, DOF 2009, EDD 2009, ICF Jones & Stokes 2009.

If a general plan demonstrates, through dividing the emissions inventory projections (MT CO₂e) by the amount of growth that would be accommodated in 2020, that it could meet the GHG efficiency metrics in this section (6.6 MT CO₂e/SP from all emission sectors, as noted in Table 7), then the amount of GHG emissions associated with the general plan would be considered less than significant, regardless of its size (and magnitude of GHG emissions). In other words, the general plan would accommodate growth in a manner that would not hinder the State’s ability to achieve AB 32 goals, and thus, would be less than significant for GHG emissions and their contribution to climate change. The efficiency metric would not penalize well-planned communities that propose a large amount of development. Instead, the SP-based GHG efficiency metric acts to encourage the types of development that BAAQMD and OPR support (i.e., infill and transit-oriented development) because it tends to reduce GHG and other air pollutant emissions overall, rather than discourage large developments for being accompanied by a large mass of GHG emissions. Plans that are more GHG efficient would have no or limited mitigation requirements to help them complete the CEQA process more readily than plans that promote GHG inefficiencies, which will require detailed design of mitigation during the CEQA process and could subject a plan to potential challenge as to whether all feasible mitigation was identified and adopted. This type of threshold can shed light on a well-planned general plan that accommodates a large amount of growth in a GHG-efficient way.

When analyzing long-range plans, such as general plans, it is important to note that the planning horizon will often surpass the 2020 timeframe for implementation of AB 32. Executive Order S-3-05 establishes a more aggressive emissions reduction goal for the year 2050 of 80 percent below 1990 emissions levels. The year 2020 should be viewed as a milestone year, and the general plan should not preclude the community from a trajectory toward the 2050 goal. However, the 2020 timeframe is examined in this threshold evaluation because doing so for the 2050 timeframe (with respect to population, employment, and GHG emissions projections) would be too speculative. Advances in technology and policy decisions at the state level will be needed to meet the aggressive 2050 goals. It is beyond the scope of the analysis tools available at this time to examine reasonable emissions reductions that can be achieved through CEQA analysis in the year 2050. As the 2020 timeframe draws nearer, BAAQMD will need to reevaluate the threshold to better represent progress toward 2050 goals.

2.2.4. Greenhouse Gas Reduction Strategies

Finally, many local agencies have already undergone or plan to undergo efforts to create general or other plans that are consistent with AB 32 goals. The Air District encourages such planning efforts and recognizes that careful upfront planning by local agencies is invaluable to achieving the state’s GHG reduction goals. If a project is consistent with an adopted Qualified Greenhouse Gas Reduction Strategy that addresses the project’s GHG emissions, it can be presumed that the project will not have significant GHG emission impacts. This approach is consistent with CEQA Guidelines Sections 15064(h)(3) and 15183.5(b), which provides that a “lead agency may determine that a project’s incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or



mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem.”

A qualified Greenhouse Gas Reduction Strategy (or similar adopted policies, ordinances and programs) is one that is consistent with all of the AB 32 Scoping Plan measures and goals. The Greenhouse Gas Reduction Strategy should identify a land use design, transportation network, goals, policies and implementation measures that would achieve AB 32 goals. Strategies with horizon years beyond 2020 should consider continuing the downward reduction path set by AB 32 and move toward climate stabilization goals established in Executive Order S-3-05.

Qualified Greenhouse Gas Reduction Strategy

A qualified Greenhouse Gas Reduction Strategy adopted by a local jurisdiction should include the following elements as described in the State CEQA Guidelines Section 15183.5. The District’s revised CEQA Guidelines provides the methodology to determine if a Greenhouse Gas Reduction Strategy meets these requirements.

- (A) Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
- (B) Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable;
- (C) Identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area;
- (D) Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
- (E) Establish a mechanism to monitor the plan’s progress toward achieving the level and to require amendment if the plan is not achieving specified levels;
- (F) Be adopted in a public process following environmental review.

Local Climate Action Policies, Ordinances and Programs

Air District staff recognizes that many communities in the Bay Area have been proactive in planning for climate change but have not yet developed a stand-alone Greenhouse Gas Reduction Strategy that meets the above criteria. Many cities and counties have adopted climate action policies, ordinances and program that may in fact achieve the goals of AB 32 and a qualified Greenhouse Gas Reduction Strategy. Staff recommends that if a local jurisdiction can demonstrate that its collective set of climate action policies, ordinances and other programs is consistent with AB 32 and State CEQA Guidelines Section 15183.5, includes requirements or feasible measures to reduce GHG emissions and achieves one of the following GHG emission reduction goals,⁹ the AB 32 consistency demonstration should be considered equivalent to a qualified Greenhouse Gas Reduction Strategy:

- 1990 GHG emission levels,
- 15 percent below 2008 emission levels, or

⁹ Lead agencies using consistency with their jurisdiction’s climate action policies, ordinances and programs as a measure of significance under CEQA Guidelines section 15064(h)(3) and 15183.5(b) should ensure that the policies, ordinances and programs satisfy all of the requirements of that subsection before relying on them in a CEQA analysis.



- Meet the plan efficiency threshold of 6.6 MT CO₂e/service population/year.

Qualified Greenhouse Gas Reduction Strategies that are tied to the AB 32 reduction goals would promote reductions on a plan level without impeding the implementation of GHG-efficient development, and would recognize the initiative of many Bay Area communities who have already developed or are in the process of developing a GHG reduction plan. The details required above for a qualified Greenhouse Gas Reduction Strategy (or similar adopted policies, ordinances and programs) would provide the evidentiary basis for making CEQA findings that development consistent with the plan would result in feasible, measurable, and verifiable GHG reductions consistent with broad state goals such that projects approved under qualified Greenhouse Gas Reduction Strategies or equivalent demonstrations would achieve their fair share of GHG emission reductions.

GHG Thresholds for Regional Plans

Regional plans include the Regional Transportation Plan prepared by the Metropolitan Transportation Commission (MTC) and air quality plans prepared by the Air District.

The Regional Transportation Plan (RTP), also called a Metropolitan Transportation Plan (MTP) or Long-Range Transportation Plan is the mechanism used in California by both Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) to conduct long-range (minimum of 20 years) planning in their regions. MTC functions as both the regional transportation planning agency, a state designation, and, for federal purposes, as the region's metropolitan planning organization (MPO). As such, it is responsible for regularly updating the Regional Transportation Plan, a comprehensive blueprint for the development of the Bay Area's transportation system that includes mass transit, highway, airport, seaport, railroad, bicycle and pedestrian facilities. The performance of this system affects such public policy concerns as air quality, environmental resource consumption, social equity, "smart growth," economic development, safety, and security. Transportation planning recognizes the critical links between transportation and other societal goals. The planning process requires developing strategies for operating, managing, maintaining, and financing the area's transportation system in such a way as to advance the area's long-term goals.

The Air District periodically prepares and updates plans to achieve the goal of healthy air. Typically, a plan will analyze emissions inventories (estimates of current and future emissions from industry, motor vehicles, and other sources) and combine that information with air monitoring data (used to assess progress in improving air quality) and computer modeling simulations to test future strategies to reduce emissions in order to achieve air quality standards. Air quality plans usually include measures to reduce air pollutant emissions from industrial facilities, commercial processes, motor vehicles, and other sources. Bay Area air quality plans are prepared with the cooperation of MTC, the Association of Bay Area Governments (ABAG) and the Bay Conservation and Development Commission (BCDC).

The threshold of significance for regional plans is no net increase in emissions including greenhouse gas emissions. This threshold serves to answer the State CEQA Guidelines Appendix G sample question: "Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?"

2.2.5. Stationary Source GHG Threshold

Staff's recommended threshold for stationary source GHG emissions is based on estimating the GHG emissions from combustion sources for all permit applications submitted to the Air District in 2005, 2006 and 2007. The analysis is based only on CO₂ emissions from stationary sources, as that would cover the vast majority of the GHG emissions due to stationary combustion sources in



the SFBAAB. The estimated CO₂ emissions were calculated for the maximum permitted amount, i.e. emissions that would be emitted if the sources applying for a permit application operate at maximum permitted load and for the total permitted hours. All fuel types are included in the estimates. For boilers burning natural gas, diesel fuel is excluded since it is backup fuel and is used only if natural gas is not available. Emission values are estimated before any offsets (i.e., Emission Reduction Credits) are applied. GHG emissions from mobile sources, electricity use and water delivery associated with the operation of the permitted sources are not included in the estimates.

It is projected that a threshold level of 10,000 metric tons of CO₂e per year would capture approximately 95 percent of all GHG emissions from new permit applications from stationary sources in the SFBAAB. That threshold level was calculated as an average of the combined CO₂ emissions from all stationary source permit applications submitted to the Air District during the three year analysis period.

Staff recommends this 10,000 MT of CO₂/yr as it would address a broad range of combustion sources and thus provide for a greater amount of GHG reductions to be captured and mitigated through the CEQA process. As documented in the Scoping Plan, in order to achieve statewide reduction targets, emissions reductions need to be obtained through a broad range of sources throughout the California economy and this threshold would achieve this purpose. While this threshold would capture 95 percent of the GHG emissions from new permit applications, the threshold would do so by capturing only the large, significant projects. Permit applications with emissions above the 10,000 MT of CO₂/yr threshold account for less than 10 percent of stationary source permit applications which represent 95 percent of GHG emissions from new permits analyzed during the three year analysis period.

This threshold would be considered an interim threshold and Air District staff will reevaluate the threshold as AB 32 Scoping Plan measures such as cap and trade are more fully developed and implemented at the state level.

2.2.6. Summary of Justification for GHG Thresholds

The bright-line numeric threshold of 1,100 MT CO₂e/yr is a numeric emissions level below which a project's contribution to global climate change would be less than "cumulatively considerable." This emissions rate is equivalent to a project size of approximately 60 single-family dwelling units, and approximately 59 percent of all future projects and 92 percent of all emissions from future projects would exceed this level. For projects that are above this bright-line cutoff level, emissions from these projects would still be less than cumulatively significant if the project as a whole would result in an efficiency of 4.6 MT CO₂e per service population or better for mixed-use projects. Projects with emissions above 1,100 MT CO₂e/yr would therefore still be less than significant if they achieved project efficiencies below these levels. If projects as proposed exceed these levels, they would be required to implement mitigation measures to bring them back below the 1,100 MT CO₂e/yr bright-line cutoff or within the 4.6 MT CO₂e Service Population efficiency threshold. If mitigation did not bring a project back within the threshold requirements, the project would be cumulatively significant and could be approved only with a Statement of Overriding Considerations and a showing that all feasible mitigation measures have been implemented. Projects' GHG emissions would also be less than significant if they comply with a Qualified Greenhouse Gas Reduction Strategy.

As explained in the preceding analyses of these thresholds, the greenhouse gas emissions from land use projects expected between now and 2020 built in compliance with these thresholds would be approximately 26 percent below BAU 2020 conditions and thus would be consistent with achieving an AB 32 equivalent reduction. The 26 percent reduction from BAU 2020 from new



projects built in conformance with these thresholds would achieve an aggregate reduction of approximately 1.6 MMT CO₂e/yr, which is the level of emission reductions from new Bay Area land use sources needed to meet the AB 32 goals, per ARB's Scoping Plan as discussed above.

Projects with greenhouse gas emissions in conformance with these thresholds would therefore not be considered significant for purposes of CEQA. Although the emissions from such projects would add an incremental amount to the overall greenhouse gas emissions that cause global climate change impacts, emissions from projects consistent with these thresholds would not be a "cumulatively considerable" contribution under CEQA. Such projects would not be "cumulatively considerable" because they would be helping to solve the cumulative problem as a part of the AB 32 process.

California's response to the problem of global climate change is to reduce greenhouse gas emissions to 1990 levels by 2020 under AB 32 as a near-term measure and ultimately to 80 percent below 1990 levels by 2050 as the long-term solution to stabilizing greenhouse gas concentrations in the atmosphere at a level that will not cause unacceptable climate change impacts. To implement this solution, the Air Resources Board has adopted a Scoping Plan and budgeted emissions reductions that will be needed from all sectors of society in order to reach the interim 2020 target.

The land-use sector in the Bay Area needs to achieve aggregate emission reductions of approximately 1.6 MMT CO₂e/yr from new projects between now and 2020 to achieve this goal, as noted above, and each individual new project will need to achieve its own respective portion of this amount in order for the Bay Area land use sector as a whole to achieve its allocated emissions target. Building all of the new projects expected in the Bay Area between now and 2020 in accordance with the thresholds that District staff are proposing will achieve the overall appropriate share for the land use sector, and building each individual project in accordance with the thresholds will achieve that individual project's respective portion of the emission reductions needed to implement the AB 32 solution. For these reasons, projects built in conformance with the thresholds will be part of the solution to the cumulative problem, and not part of the continuing problem. They will allow the Bay Area's land use sector to achieve the emission reductions necessary from that sector for California to implement its solution to the cumulative problem of global climate change. As such, even though such projects will add an incremental amount of greenhouse gas emissions, their incremental contribution will be less than "cumulatively considerable" because they are helping to achieve the cumulative solution, not hindering it. Such projects will therefore not be "significant" for purposes of CEQA (see CEQA Guidelines §15064(h)(1)).

The conclusion that land use projects that comply with these thresholds is also supported by CEQA Guidelines Section 15030(a)(3), which provides that a project's contribution to a cumulative problem can be less than cumulatively considerable "if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." In the case of greenhouse gas emissions associated with land use projects, achieving the amount of emission reductions below BAU that will be required to achieve the AB 32 goals is the project's "fair share" of the overall emission reductions needed under ARB's scoping plan to reach the overall statewide AB 32 emissions levels for 2020. If a project is designed to implement greenhouse gas mitigation measures that achieve a level of reductions consistent with what is required from all new land use projects to achieve the land use sector "budget" – *i.e.*, keeping overall project emissions below 1,100 MT CO₂e/yr or ensuring that project efficiency is better than 4.6 MT CO₂e/service population – then it will be implementing its share of the mitigation measures necessary to alleviate the cumulative impact, as shown in the analyses set forth above.



It is also worth noting that this “fair share” approach is flexible and will allow a project’s significance to be determined by how well it is designed from a greenhouse gas efficiency standpoint, and not just by the project’s size. For example, a large high-density infill project located in an urban core nearby to public transit and other alternative transportation options, and built using state-of-the-art energy efficiency methods and improvements such as solar panels, as well as all other feasible mitigation measures, would not become significant for greenhouse gas purposes (and thus require a Statement of Overriding Considerations in order to be approved) simply because it happened to be a large project. Projects such as this hypothetical development with low greenhouse gas emissions per service population are what California will need in the future in order to do its part in achieving a solution to the problem of global climate change. The determination of significance under CEQA should therefore take these factors into account, and the significance thresholds would achieve this important policy goal. In all, land use sector projects that comply with the GHG thresholds would not be “cumulatively considerable” because they would be helping to solve the cumulative problem as a part of the AB 32 process.

Likewise, new Air District permit applications for stationary sources that comply with the quantitative threshold of 10,000 MT CO₂e/yr would not be “cumulatively considerable” because they also would not hinder the state’s ability to solve the cumulative greenhouse gas emissions problem pursuant to AB 32. Unlike the land use sector, the AB 32 Scoping Plan measures, including the cap-and-trade program, provide for necessary emissions reductions from the stationary source sector to achieve AB 32 2020 goals.

While stationary source projects will need to comply with the cap-and-trade program once it is enacted and reduce their emissions accordingly, the program will be phased in over time starting in 2012 and at first will only apply to the very largest sources of GHG emissions. In the mean time, certain stationary source projects, particularly those with large GHG emissions, still will have a cumulatively considerable impact on climate change. The 10,000 MT CO₂e/yr threshold will capture 95 percent of the stationary source sector GHG emissions in the Bay Area. The five percent of emissions that are from stationary source projects below the 10,000 MT CO₂e/yr threshold account for a small portion of the Bay Area’s total GHG emissions from stationary sources and these emissions come from very small projects. Such small stationary source projects will not significantly add to the global problem of climate change, and they will not hinder the Bay Area’s ability to reach the AB 32 goal in any significant way, even when considered cumulatively. In Air District’s staff’s judgment, the potential environmental benefits from requiring EIRs and mitigation for these projects would be insignificant. In all, based on staff’s expertise, stationary source projects with emissions below 10,000 MT CO₂e/yr will not provide a cumulatively considerable contribution to the cumulative impact of climate change.

3. COMMUNITY RISK AND HAZARD THRESHOLDS

To address community risk from air toxics, the Air District initiated the Community Air Risk Evaluation (CARE) program in 2004 to identify locations with high levels of risk from ambient toxic air contaminants (TAC) co-located with sensitive populations and use the information to help focus mitigation measures. Through the CARE program, the Air District developed an inventory of TAC emissions for 2005 and compiled demographic and health indicator data. According to the findings of the CARE Program, diesel PM—mostly from on and off-road mobile sources—accounts for over 80 percent of the inhalation cancer risk from TACs in the Bay Area (BAAQMD 2006).

The Air District applied a regional air quality model using the 2005 emission inventory data to estimate excess cancer risk from ambient concentrations of important TAC species, including diesel PM, 1,3-butadiene, benzene, formaldehyde and acetaldehyde. The highest cancer risk



levels from ambient TAC in the Bay Area tend to occur in the core urban areas, along major roadways and adjacent to freeways and port activity. Cancer risks in areas along these major freeways are estimated to range from 200 to over 500 excess cases in a million for a lifetime of exposure. Priority communities within the Bay Area – defined as having higher emitting sources, highest air concentrations, and nearby low income and sensitive populations – include the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose.

Fifty percent of BAAQMD's population was estimated to have an ambient background inhalation cancer risk of less than 500 cases in one million, based on emission levels in 2005. Table 8 presents a summary of percentages of the population exposed to varying levels of cancer risk from ambient TACs. Approximately two percent of the SFBAAB population is exposed to background risk levels of less than 200 excess cases in one million. This is in contrast to the upper percentile ranges where eight percent of the SFBAAB population is exposed to background risk levels of greater than 1,000 excess cases per one million. To identify and reduce risks from TAC, this chapter presents thresholds of significance for both cancer risk and non-cancer health hazards.

Percentage of Population (Percent below level of ambient risk)	Ambient Cancer Risk (inhalation cancer cases in one million)
92	1,000
90	900
83	800
77	700
63	600
50	500
32	400
13	300
2	200
<1	100

Source: Data compiled by EDAW 2009.

Many scientific studies have linked fine particulate matter and traffic-related air pollution to respiratory illness (Hiltermann et al. 1997, Schikowski et al 2005, Vineis et al. 2007) and premature mortality (Dockery 1993, Pope et al. 1995, Jerrett et al. 2005). Traffic-related air pollution is a complex mix of chemical compounds (Schauer et al. 2006), often spatially correlated with other stressors, such as noise and poverty (Wheeler and Ben-Shlomo 2005). While such correlations can be difficult to disentangle, strong evidence for adverse health effects of fine particulate matter (PM_{2.5}) has been developed for regulatory applications in a study by the U.S. EPA. This study found that a 10 percent increase in PM_{2.5} concentrations increased the non-injury death rate by 10 percent (U.S. EPA 2006).

Public Health Officers for four counties in the San Francisco Bay Area in 2009 provided testimony to the Air District's Advisory Council (February 11, 2009, Advisory Council Meeting on Air Quality



and Public Health). Among the recommendations made, was that PM_{2.5}, in addition to TACs, be considered in assessments of community-scale impacts of air pollution. In consideration of the scientific studies and recommendations by the Bay Area Health Directors, it is apparent that, in addition to the significance thresholds for local-scale TAC, thresholds of significance are required for near-source, local-scale concentrations of PM_{2.5}.

3.1. **THRESHOLDS OF SIGNIFICANCE**

The thresholds of significance and Board-requested options are presented in this section:

- The **Staff Proposal** includes thresholds for cancer risk, non-cancer health hazards, and fine particulate matter.
- **Tiered Thresholds Option** includes tiered thresholds for new sources in impacted communities. Thresholds for receptors and cumulative impacts are the same as the Staff Proposal.

Proposal/Option	Construction-Related	Operational-Related
Project-Level – Individual Project		
Risks and Hazards – New Source (All Areas) (Individual Project) <u>Staff Proposal</u>	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Receptor (All Areas) (Individual Project) <u>Staff Proposal</u>	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor



Proposal/Option	Construction-Related	Operational-Related
<p>Risks and Hazards (Individual Project)</p> <p><u>Tiered Thresholds Option</u></p>	<p>Same as Operational Thresholds*</p>	<p><u>Impacted Communities: Siting a New Source</u></p> <p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >5.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM_{2.5} increase: > 0.2 µg/m³ annual average</p> <p><u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor</p>
	<p>Same as Operational Thresholds*</p>	<p><u>Impacted Communities: Siting a New Receptor</u></p> <p><u>All Other Areas: Siting a New Source or Receptor</u></p> <p>Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM_{2.5} increase: > 0.3 µg/m³ annual average</p> <p><u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor</p>
<p>Accidental Release of Acutely Hazardous Air Pollutants</p>	<p>None</p>	<p>Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant</p>
<p>Project-Level – Cumulative</p>		



Proposal/Option	Construction-Related	Operational-Related
Risks and Hazards – New Source (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) <u>PM_{2.5}</u> : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Risks and Hazards – New Receptor (All Areas) (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) <u>PM_{2.5}</u> : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Plan-Level		
Risks and Hazards	None	1. Overlay zones around existing and planned sources of TACs (including adopted Risk Reduction Plan areas). 2. Overlay zones of at least 500 feet (or Air District-approved modeled distance) from all freeways and high volume roadways.
Accidental Release of Acutely Hazardous Air Pollutants	None	None
Regional Plans (Transportation and Air Quality Plans)		
Risks and Hazards	None	No net increase in toxic air contaminants

* Note: The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.



3.2. JUSTIFICATION AND SUBSTANTIAL EVIDENCE SUPPORTING THRESHOLDS

The goal of the thresholds is to ensure that no source creates, or receptor endures, a significant adverse impact from any individual project, and that the total of all nearby directly emitted risk and hazard emissions is also not significantly adverse. The thresholds for local risks and hazards from TAC and PM_{2.5} are intended to apply to all sources of emissions, including both permitted stationary sources and on- and off-road mobile sources, such as sources related to construction, busy roadways, or freight movement.

Thresholds for an individual new source are designed to ensure that the source does not contribute to a cumulatively significant impact. Cumulative thresholds for sources recognize that some areas are already near or at levels of significant impact. If within such an area there are receptors, or it can reasonably be foreseen that there will be receptors, then a cumulative significance threshold sets a level beyond which any additional risk is significant.

For new receptors – sensitive populations or the general public – thresholds of significance are designed to identify levels of contributed risk or hazards from existing local sources that pose a significant risk to the receptors. Single-source thresholds for receptors are provided to recognize that within the area defined there can be variations in risk levels that may be significant. Single-source thresholds assist in the identification of significant risks, hazards, or concentrations in a subarea, within the area defined by the selected radius. Cumulative thresholds for receptors are designed to account for the effects of all sources within the defined area.

Cumulative thresholds, for both sources and receptors, must consider the size of the source area, defined by a radius from the proposed project. To determine cumulative impacts from a prescribed zone of influence requires the use of modeling. The larger the radius, the greater the number of sources considered that may contribute to the modeled risk and, until the radius approaches a regional length scale, the greater the expected modeled risk increment. If the area of impact considered were grown to the scale of a city, the modeled risk increment would approach the risk level present in the ambient air.

3.2.1. Scientific and Regulatory Justification

Regulatory Framework for TACs

Prior to 1990, the Clean Air Act required EPA to list air toxics it deemed hazardous and to establish control standards which would restrict concentrations of hazardous air pollutants (HAP) to a level that would prevent any adverse effects “with an ample margin of safety.” By 1990, EPA had regulated only seven such pollutants and it was widely acknowledged by that time that the original Clean Air Act had failed to address toxic air emissions in any meaningful way. As a result, Congress changed the focus of regulation in 1990 from a risk-based approach to technology-based standards. Title III, Section 112(b) of the 1990 Clean Air Act Amendment established this new regulatory approach. Under this framework, prescribed pollution control technologies based upon maximum achievable control technology (MACT) were installed without the a priori estimation of the health or environmental risk associated with each individual source. The law listed 188 HAPs that would be subject to the MACT standards. EPA issued 53 standards for 89 different types of major industrial sources of air toxics and eight categories of smaller sources such as dry cleaners. These requirements took effect between 1996 and 2002. Under the federal Title V Air Operating Permit Program, a facility with the potential to emit 10 tons of any toxic air pollutant, or 25 tons per year of any combination of toxic air pollutants, is defined as a major source HAPs. Title V permits include requirements for these facilities to limit toxic air pollutant emissions.



Several state and local agencies adopted programs to address gaps in EPA's program prior to the overhaul of the national program in 1990. California's program to reduce exposure to air toxics was established in 1983 by the Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner 1983) and the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly 1987). Under AB 1807, ARB and the Office of Environmental Health Hazard Assessment (OEHHA) determines if a substance should be formally identified as a toxic air contaminant (TAC) in California. OEHHA also establishes associated risk factors and safe concentrations of exposure.

AB 1807 was amended in 1993 by AB 2728, which required ARB to identify the 189 federal hazardous air pollutants as TACs. AB 2588 (Connelly, 1987) supplements the AB 1807 program, by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks. In September 1992, the "Hot Spots" Act was amended by Senate Bill 1731 which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

Cancer Risk

Cancer risk from TACs is typically expressed in numbers of excess cancer cases per million persons exposed over a defined period of exposure, for example, over an assumed 70 year lifetime. The Air District is not aware of any agency that has established an acceptable level of cancer risk for TACs. However, a range of what constitutes a significant increment of cancer risk from any compound has been established by the U.S. EPA. EPA's guidance for conducting air toxics analyses and making risk management decisions at the facility- and community-scale level considers a range of acceptable cancer risks from one in a million to one in ten thousand (100 in a million). The guidance considers an acceptable range of cancer risk increments to be from one in a million to one in ten thousand. In protecting public health with an ample margin of safety, EPA strives to provide maximum feasible protection against risks to health from HAPs by limiting additional risk to a level no higher than the one in ten thousand estimated risk that a person living near a source would be exposed to at the maximum pollutant concentrations for 70 years. This goal is described in the preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking (54 Federal Register 38044, September 14, 1989) and is incorporated by Congress for EPA's residual risk program under Clean Air Act section 112(f).

Regulation 2, Rule 5 of the Air District specifies permit requirements for new and modified stationary sources of TAC. The Project Risk Requirement (2-5-302.1) states that the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project cancer risk exceeds 10.0 in one million.

Hazard Index for Non-cancer Health Effects

Non-cancer health hazards for chronic and acute diseases are expressed in terms of a hazard index (HI), a ratio of TAC concentration to a reference exposure level (REL), below which no adverse health effects are expected, even for sensitive individuals. As such, OEHHA has defined acceptable concentration levels, and also significant concentration increments, for compounds that pose non-cancer health hazards. If the HI for a compound is less than one, non-cancer chronic and acute health impacts have been determined to be less than significant.

State and Federal Ambient Air Quality Standards for PM_{2.5}

The Children's Environmental Health Protection Act (Senate Bill 25), passed by the California state legislature in 1999, requires ARB, in consultation with OEHHA, to "review all existing health-based ambient air quality standards to determine whether, based on public health, scientific literature and exposure pattern data, these standards adequately protect the public, including infants and children, with an adequate margin of safety." As a result of the review requirement, in 2002 ARB adopted an annual average California Ambient Air Quality Standard (CAAQS) for



PM_{2.5} of 12 ug/m³ that is not to be exceeded (California Code of Regulations, Title 17 § 70200, Table of Standards). The National Ambient Air Quality Standard (NAAQS) established an annual standard for PM_{2.5} (15 ug/m³) that is less stringent than the CAAQS, but also set a 24-hour average standard (35 ug/m³), which is not included in the CAAQS (Code of Federal Regulations, Title 40, Part 50.7).

Significant Impact Levels for PM_{2.5}

EPA recently proposed and documented alternative options for PM_{2.5} Significant Impact Levels (SILs) (Federal Register 40 CFR Parts 51 and 52, September 21, 2007). The EPA is proposing to facilitate implementation of a PM_{2.5} Prevention of Significant Deterioration (PSD) program in areas attaining the PM_{2.5} NAAQS by developing PM_{2.5} increments, or SILs. These “increments” are maximum increases in ambient PM_{2.5} concentrations (PM_{2.5} increments) allowed in an area above the baseline concentration.

The SIL is a threshold that would be applied to individual facilities that apply for a permit to emit a regulated pollutant in an area that meets the NAAQS. The State and EPA must determine if emissions from that facility will cause the air quality to worsen. If an individual facility projects an increase in emissions that result in ambient impacts greater than the established SIL, the permit applicant would be required to perform additional analyses to determine if those impacts will be more than the amount of the PSD increment. This analysis would combine the impact of the proposed facility when added to all other sources in the area.

The EPA is proposing such values for PM_{2.5} that will be used as screening tools by a major source subject to PSD to determine the subsequent level of analysis and data gathering required for a PSD permit application for emissions of PM_{2.5}. The SIL is one element of the EPA program to prevent deterioration in regional air quality and is utilized in the new source review (NSR) process. New source review is required under Section 165 of the Clean Air Act, whereby a permit applicant must demonstrate that emissions from the proposed construction and operation of a facility “will not cause, or contribute to, air pollution in excess of any maximum allowable increase or maximum allowable concentration for any pollutant.” The purpose of the SIL is to provide a screening level that triggers further analysis in the permit application process.

For the purpose of NSR, SILs are set for three types of areas: Class I areas where especially clean air is most desirable, including national parks and wilderness areas; Class II areas where there is not expected to be substantial industrial growth; and Class III areas where the highest relative level of industrial development is expected. In Class II and Class III areas, a PM_{2.5} concentration of 0.3, 0.8, and 1 ug/m³ has been proposed as a SIL. To arrive at the SIL PM_{2.5} option of 0.8 ug/m³, EPA scaled an established PM₁₀ SILs of 1.0 ug/m³ by the ratio of emissions of PM_{2.5} to PM₁₀ using the EPA’s 1999 National Emissions Inventory. To arrive at the SIL option of 0.3 ug/m³, EPA scaled the PM₁₀ SIL of 1.0 ug/m³ by the ratio of the current Federal ambient air quality standards for PM_{2.5} and PM₁₀ (15/50). These options represent what EPA currently considers as a range of appropriate SIL values.

EPA interprets the SIL to be the level of PM_{2.5} increment that represents a “significant contribution” to regional non-attainment. While SIL options were not designed to be thresholds for assessing community risk and hazards, they are being considered to protect public health at a regional level by helping an area maintain the NAAQS. Furthermore, since it is the goal of the Air District to achieve and maintain the NAAQS and CAAQS at both regional and local scales, the SILs may be reasonably be considered as thresholds of significance under CEQA for local-scale increments of PM_{2.5}.



Roadway Proximity Health Studies

Several medical research studies have linked near-road pollution exposure to a variety of adverse health outcomes impacting children and adults. Kleinman et al. (2007) studied the potential of roadway particles to aggravate allergic and immune responses in mice. Using mice that were not inherently susceptible, the researchers placed these mice at various distances downwind of State Road 60 and Interstate 5 freeways in Los Angeles to test the effect these roadway particles have on their immune system. They found that within five meters of the roadway, there was a significant allergic response and elevated production of specific antibodies. At 150 meters (492 feet) and 500 meters (1,640 feet) downwind of the roadway, these effects were not statistically significant.

Another significant study (Ven Hee et al. 2009) conducted a survey involving 3,827 participants that aimed to determine the effect of residential traffic exposure on two preclinical indicators of heart failure; left ventricular mass index (LVMI), measured by the cardiac magnetic resonance imaging (MRI), and ejection fraction. The studies classified participants based on the distance between their residence and the nearest interstate highway, state or local highway, or major arterial road. Four distance groups were defined: less than 50 meters (165 feet), 50-100 meters, 101-150 meters, and greater than 150 meters. After adjusting for demographics, behavioral, and clinical covariates, the study found that living within 50 meters of a major roadway was associated with a 1.4 g/m² higher LVMI than living more than 150 meters from one. This suggests an association between traffic-related air pollution and increased prevalence of a preclinical predictor of heart failure among people living near roadways.

To quantify the roadway concentrations of PM_{2.5} that contributed to the health impacts reported by Kleinman et al (2007), the Air District modeled the emissions and associated particulate matter concentrations for the roadways studied. To perform the modeling, emissions were estimated for Los Angeles using the EMFAC model and annual average vehicle traffic data taken from Caltrans was used in the roadway model (CAL3QHCR) to estimate the downwind PM_{2.5} concentrations at 50 meters and 150 meters. Additionally, emissions were assumed to occur from 10:00 a.m. to 2:00 p.m. corresponding to the time in which the mice were exposed during the study. The results of the modeling indicate that at 150 meters, where no significant health effects were found, the downwind concentration of PM_{2.5} was 0.78 µg/m³, consistent with the proposed EPA SIL option of 0.8 µg/m³.

Concentration-Response Function for PM_{2.5}

The U.S. EPA reevaluated the relative risk of premature death associated with PM_{2.5} exposure and developed a new relative risk factor (U.S. EPA 2006). This expert elicitation was prepared in support of the characterization of uncertainty in EPA's benefits analyses associated with reductions in exposure to particulate matter pollution. As recommended by the National Academy of Sciences, EPA used expert judgment to better describe the uncertainties inherent in their benefits analysis. Twelve experts participated in the study and provided not just a point estimate of the health effects of PM_{2.5}, but a probability distribution representing the range where they expected the true effect would be. Among the experts who directly incorporated their views on the likelihood of a causal relationship into their distributions, the central (median) estimates of the percent change in all-cause mortality in the adult U.S. population that would result from a permanent 1 µg/m³ drop in annual average PM_{2.5} concentrations ranged from 0.7 to 1.6 percent. The median of their estimates was 1.0 (% increase per 1 µg/m³ increase in PM_{2.5}), with a 90% confidence interval of 0.3 to 2.0 (medians of their 5th and 95th percentiles, respectively) (BAAQMD 2010). Subsequent to the EPA elicitation, Schwartz et al. (2008) examined the linearity of the concentration-response function of PM_{2.5}-mortality and showed that the response function was linear, with health effects clearly continuing below the current U.S. standard of 15 µg/m³, and that the effects of changes in exposure on mortality were seen within two years.



San Francisco Ordinance on Roadway Proximity Health Effects

In 2008, the City and County of San Francisco adopted an ordinance (San Francisco Health Code, Article 38 - Air Quality Assessment and Ventilation Requirement for Urban Infill Residential Development, Ord. 281-08, File No. 080934, December 5, 2008) requiring that public agencies in San Francisco take regulatory action to prevent future air quality health impacts from new sensitive uses proposed near busy roadways (SFDPH 2008). The regulation requires that developers screen sensitive use projects for proximity to traffic and calculate the concentration of PM_{2.5} from traffic sources where traffic volumes suggest a potential hazard. If modeled levels of traffic-attributable PM_{2.5} at a project site exceed an action level (currently set at 0.2 µg/m³) developers would be required to incorporate ventilation systems to remove 80 percent of PM_{2.5} from outdoor air. The regulation does not place any requirements on proposed sensitive uses if modeled air pollutant levels fall below the action threshold. This ordinance only considers impacts from on-road motor vehicles, not impacts related to construction equipment or stationary sources.

A report with supporting documentation for the ordinance (SFPHD 2008) provided a threshold to trigger action or mitigation of 0.2 µg/m³ of PM_{2.5} annual average exposure from roadway vehicles within a 150 meter (492 feet) maximum radius of a sensitive receptor. The report applied the concentration-response function from Jerrett et al. (2005) that attributed 14 percent increase in mortality to a 10 µg/m³ increase in PM_{2.5} to estimate an increase in non-injury mortality in San Francisco of about 21 excess deaths per million population per year from a 0.2 µg/m³ increment of annual average PM_{2.5}.

Distance for Significant Impact

The distance used for the radius around the project boundary should reflect the zone or area over which sources may have a significant influence. For cumulative thresholds, for both sources and receptors, this distance also determines the size of the source area, defined. To determine cumulative impacts from a prescribed zone of influence requires the use of modeling. The larger the radius, the greater the number of sources considered that may contribute to the risk and the greater the expected modeled risk increment. If the area of impact considered were grown to approach the scale of a city, the modeled risk increment would approach the risk level present in the ambient air.

A summary of research findings in ARB's Land Use Compatibility Handbook (ARB 2005) indicates that traffic-related pollutants were higher than regional levels within approximately 1,000 feet downwind and that differences in health-related effects (such as asthma, bronchitis, reduced lung function, and increased medical visits) could be attributed in part to the proximity to heavy vehicle and truck traffic within 300 to 1,000 feet of receptors. In the same summary report, ARB recommended avoiding siting sensitive land uses within 1,000 feet of a distribution center and major rail yard, which supports the use of a 1,000 feet evaluation distance in case such sources may be relevant to a particular project setting. A 1,000 foot zone of influence is also supported by Health & Safety Code §42301.6 (Notice for Possible Source Near School).

Some studies have shown that the concentrations of particulate matter tend to be reduced substantially or can even be indistinguishable from upwind background concentrations at a distance 1,000 feet downwind from sources such as freeways or large distribution centers. Zhu et al. (2002) conducted a systematic ultrafine particle study near Interstate 710, one of the busiest freeways in the Los Angeles Basin. Particle number concentration and size distribution were measured as a function of distances upwind and downwind of the I-710 freeway. Approximately 25 percent of the 12,180 vehicles per hour are heavy duty diesel trucks based on video counts conducted as part of the research. Measurements were taken at 13 feet, 23 feet, 55 feet, 252 feet, 449 feet, and 941 feet downwind and 613 feet upwind from the edge of the freeway. The particle number and supporting measurements of carbon monoxide and black carbon decreased



exponentially and all constituents simultaneously tracked with each other as one moves away from the freeway. Ultrafine particle size distribution changed markedly and its number concentrations dropped dramatically with increasing distance. The study found that ultrafine particle concentrations measured 941 feet downwind of I-710 were indistinguishable from the upwind background concentration.

Impacted Communities

Starting in 2006, the Air District's CARE program developed gridded TAC emissions inventories and compiled demographic information that were used to identify communities that were particularly impacted by toxic air pollution for the purposes of distributing grant and incentive funding. In 2009, the District completed regional modeling of TAC on a one kilometer by one kilometer grid system. This modeling was used to estimate cancer risk and TAC population exposures for the entire District. The information derived from the modeling was then used to update and refine the identification of impacted communities. One kilometer modeling yielded estimates of annual concentrations of five key compounds – diesel particulate matter, benzene, 1,3-butadiene, formaldehyde, and acetaldehyde – for year 2005. These concentrations were multiplied by their respective unit cancer risk factors, as established by OEHHA, to estimate the expected excess cancer risk per million people from these compounds.

Sensitive populations from the 2000 U.S. Census database were identified as youth (under 18) and seniors (over 64) and mapped to the same one kilometer grid used for the toxics modeling. Excess cancers from TAC exposure were determined by multiplying these sensitive populations by the model-estimated excess risk to establish a data set representing sensitive populations with high TAC exposures. TAC emissions (year 2005) were mapped to the one kilometer grid and also scaled by their unit cancer risk factor to provide a data set representing source regions for TAC emissions. Block-group level household income data from the U.S. Census database were used to identify block groups with family incomes where more than 40 percent of the population was below 185 percent of the federal poverty level (FPL). Poverty-level polygons that intersect high (top 50 percent) exposure cells and are within one grid cell of a high emissions cell (top 25 percent) were used to identify impacted areas. Boundaries were constructed along major roads or highways that encompass nearby high emission cells and low income areas. This method identified the following six areas as priority communities: (1) portions of the City of Concord; (2) Western Contra Costa County (including portions of the Cities of Richmond and San Pablo); (3) Western Alameda County along the Interstate-880 corridor (including portions of the Cities of Berkeley, Oakland, San Leandro, San Lorenzo, Hayward; (4) Portions of the City of San Jose. (5) Eastern San Mateo County (including portions of the Cities of Redwood City and East Palo Alto); and (6) Eastern portions of the City of San Francisco.

3.2.2. Construction, Land Use and Stationary Source Risk and Hazard Thresholds

The options for local risk and hazards thresholds of significance are based on U.S. EPA guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level. The thresholds consider reviews of recent health effects studies that link increased concentrations of fine particulate matter to increased mortality. The thresholds would apply to both siting new sources and siting new receptors.

For new sources of TACs, thresholds of significance for a single source are designed to ensure that emissions do not raise the risk of cancer or non-cancer health impacts to cumulatively significant levels. For new sources of PM_{2.5}, thresholds are designed to ensure that PM_{2.5} concentrations are maintained below state and federal standards in all areas where sensitive receptors or members of the general public live or may foreseeably live, even if at the local- or community-scale where sources of TACs and PM may be nearby.



Project Radius for Assessing Impacts

For a project proposing a new source or receptor it is recommended to assess impacts within 1,000 feet, taking into account both its individual and nearby cumulative sources (i.e. proposed project plus existing and foreseeable future projects). Cumulative sources are the combined total risk values of each individual source within the 1,000-foot evaluation zone. A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius.

The 1,000 foot radius is consistent with findings in ARB's Land Use Compatibility Handbook (ARB 2005), the Health & Safety Code §42301.6 (Notice for Possible Source Near School), and studies such as that of Zhu et al (2002) which found that concentrations of particulate matter tend to be reduced substantially at a distance 1,000 feet downwind from sources such as freeways or large distribution centers.

Qualified Community Risk Reduction Plan

Within the framework of these thresholds, proposed projects would be considered to be less than significant if they are consistent with a qualified Community Risk Reduction Plan (CRRP) adopted by the local jurisdiction with enforceable measures to reduce the community risk.

Project proposed in areas where a CRRP has been adopted that are not consistent with the CRRP would be considered to have a significant impact.

Projects proposed in areas where a CRRP has not been adopted and that have the potential to expose sensitive receptors or the general public to emissions-related risk in excess of the thresholds below from any source would be considered to have a significant air quality impact.

The conclusion that land use projects that comply with qualified Community Risk Reduction Plans are less than significant is supported by CEQA Guidelines Sections 15030(a)(3) and 15064(h)(3), which provides that a project's contribution to a cumulative problem can be less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

Increased Cancer Risk to Maximally Exposed Individual (MEI)

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million, assuming a 70 year lifetime exposure. Under Board Option 1, within Impacted Communities as defined through the CARE program, the significance level for cancer would be reduced to 5.0 in one million for new sources.

The 10.0 in one million cancer risk threshold for a single source is supported by EPA's guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level. It is also the level set by the Project Risk Requirement in the Air District's Regulation 2, Rule 5 new and modified stationary sources of TAC, which states that the Air Pollution Control Officer shall deny an Authority to Construct or Permit to Operate for any new or modified source of TACs if the project risk exceeds a cancer risk of 10.0 in one million.

This threshold for an individual new source is designed to ensure that the source does not contribute a cumulatively significant impact. The justification for the Tiered Thresholds Option threshold of 5.0 in one million for new sources in an impacted community is that in these areas the cancer risk burden is higher than in other parts of the Bay Area; the threshold at which an individual source becomes significant is lower for an area that is already at or near unhealthy levels. However, even without a tiered approach, the recommended thresholds already address the burden of impacted communities via the cumulative thresholds: specifically, if an area has



many existing TAC sources near receptors, then the cumulative threshold will be reached sooner than it would in another area with fewer TAC sources.

The single-source threshold for receptors is provided to address the possibility that within the area defined by the 1,000 foot radius there can be variations in risk levels that may be significant, below the corresponding cumulative threshold. Single-source thresholds assist in the identification of significant risks, hazards, or concentrations in a subarea, within the 1,000 foot radius.

Increased Non-Cancer Risk to MEI

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of non-carcinogenic TACs result in an increased chronic or acute Hazard Index (HI) from any source greater than 1.0. This threshold is unchanged under Tiered Thresholds Option.

A HI less than 1.0 represents a TAC concentration, as determined by OEHHA that is at a health protective level. While some TACs pose non-carcinogenic, chronic and acute health hazards, if the TAC concentrations result in a HI less than one, those concentrations have been determined to be less than significant.

Increased Ambient Concentration of PM_{2.5}

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of PM_{2.5} from any source would result in an average annual increase greater than 0.3 µg/m³. Under Tiered Thresholds Option, within Impacted Communities as defined through the CARE program, the significance level for a PM_{2.5} increment is 0.2 µg/m³.

If one applies the concentration-response of the median of the EPA consensus review (EPA 2005, BAAQMD 2010) and attributes a 1 percent increase in mortality to a 1 µg/m³ increase in PM_{2.5}, one finds an increase in non-injury mortality in the Bay Area of about 20 excess deaths per million per year from a 0.3 µg/m³ increment of PM_{2.5}. This is consistent with the impacts reported and considered significant by SFDPH (2008) using an earlier study (Jerrett et al. 2005) to estimate the increase in mortality from a 0.2 µg/m³ PM_{2.5} increment.

The SFDPH recommended a lower threshold of significance for multiple sources but only considered roadway emissions within a 492 foot radius. This recommendation applies to a single source but considers all types of emissions within 1,000 feet. On balance, the Air District estimates that the SFDPH threshold and this one, in combination with the cumulative threshold for PM_{2.5}, will afford similar levels of health protection.

The PM_{2.5} threshold represents the lower range of an EPA proposed Significant Impact Level (SIL). EPA interprets the SIL to be the level of ambient impact that is considered to represent a "significant contribution" to regional non-attainment. While this threshold was not designed to be a threshold for assessing community risk and hazards, it was designed to protect public health at a regional level by helping an area maintain the NAAQS. Since achieving and maintaining state and federal AAQS is a reasonable goal at the local scale, the SIL provides a useful reference for comparison.

This threshold for an individual new source is designed to ensure that the source does not contribute a cumulatively significant impact. The justification for the Tiered Thresholds Option threshold of 0.2 µg/m³ for new sources in an impacted community is that these areas have higher levels of diesel particulate matter than do other parts of the Bay Area; the threshold at which an individual source becomes significant is lower for an area that is already at or near unhealthy



levels. However, even without a tiered approach, the recommended thresholds already address the burden of impacted communities via the cumulative thresholds: specifically, if an area has many existing PM_{2.5} sources near receptors, then the cumulative threshold will be reached sooner than it would in another area with fewer PM_{2.5} sources.

The single-source threshold for receptors is provided to address the possibility that within the area defined by the 1,000 foot radius there can be variations in risk levels that may be significant, below the corresponding cumulative threshold. Single-source thresholds assist in the identification of significant risks, hazards, or concentrations in a subarea, within the 1,000 foot radius.

Accidental Release of Acutely Hazardous Air Emissions

The BAAQMD currently recommends, at a minimum, that the lead agency, in consultation with the administering agency of the Risk Management Prevention Program (RMPP), find that any project resulting in receptors being within the Emergency Response Planning Guidelines (ERPG) exposure level 2 for a facility has a significant air quality impact. ERPG exposure level 2 is defined as "the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action."

Staff proposes continuing with the current threshold for the accidental release of hazardous air pollutants. Staff recommends that agencies consult with the California Emergency Management Agency for the most recent guidelines and regulations for the storage of hazardous materials. Staff proposes that projects using or storing acutely hazardous materials locating near existing receptors, and projects resulting in receptors locating near facilities using or storing acutely hazardous materials be considered significant.

The current Accidental Release/Hazardous Air Emissions threshold of significance could affect all projects, regardless of size, and require mitigation for Accidental Release/Hazardous Air Emissions impacts.

3.2.3. Cumulative Risk and Hazard Thresholds

Qualified Community Risk Reduction Plan

Proposed projects would be considered to be less than significant if they are consistent with a qualified Community Risk Reduction Plan (CRRP) adopted by the local jurisdiction with enforceable measures to reduce the community risk.

Project proposed in areas where a CRRP has been adopted that are not consistent with the CRRP would be considered to have a significant impact.

Projects proposed in areas where a CRRP has not been adopted and that have the potential to expose sensitive receptors or the general public to emissions-related risk in excess of the following thresholds from the aggregate of cumulative sources would be considered to have a significant air quality impact.

The conclusion that land use projects that comply with qualified Community Risk Reduction Plans are less than significant is supported by CEQA Guidelines Sections 15030(a)(3) and 15064(h)(3), which provides that a project's contribution to a cumulative problem can be less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.



Increased Cancer Risk to Maximally Exposed Individual (MEI)

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 100.0 in one million.

The significance threshold of 100 in a million increased excess cancer risk would be applied to the cumulative emissions. The 100 in a million threshold is based on EPA guidance for conducting air toxics analyses and making risk management decisions at the facility and community-scale level. In protecting public health with an ample margin of safety, EPA strives to provide maximum feasible protection against risks to health from hazardous air pollutants (HAPs) by limiting risk to a level no higher than the one in ten thousand (100 in a million) estimated risk that a person living near a source would be exposed to at the maximum pollutant concentrations for 70 years (NESHAP 54 Federal Register 38044, September 14, 1989; CAA section 112(f)). One hundred in a million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on the District's recent regional modeling analysis.

Increased Non-Cancer Risk to MEI

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of non-carcinogenic TACs result in an increased chronic Hazard Index from any source greater than 10.0.

The Air District has developed an Air Toxics Hot Spots (ATHS) program that provides guidance for implementing the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly, 1987: chaptered in the California Health and Safety Code § 44300, et. al.). The ATHS provides that if the health risks resulting from the facility's emissions exceed significance levels established by the air district, the facility is required to conduct an airborne toxic risk reduction audit and develop a plan to implement measures that will reduce emissions from the facility to a level below the significance level. The Air District has established a non-cancer Hazard Index of ten (10.0) as ATHS mandatory risk reduction levels. The cumulative chronic non-cancer Hazard Index threshold is consistent with the Air District's ATHS program.

Increased Ambient Concentration of PM_{2.5}

Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of PM_{2.5} from any source would result in an average annual increase greater than 0.8 µg/m³.

If one applies the concentration-response function from the U.S. EPA assessment (U.S. EPA 2006) and attributes a 10 percent increase in mortality to a 10 µg/m³ increase in PM_{2.5}, one finds an increase in non-injury mortality in the Bay Area of about 50 excess deaths per year from a 0.8 µg/m³ increment of PM_{2.5}. This is greater the impacts reported and considered significant by SFDPH (2008) using an earlier study (Jerrett et al. 2005) to estimate the increase in mortality from a 0.2 µg/m³ PM_{2.5} increment (SFDPH reported 21 excess deaths per year). However, SFDPH only considered roadway emissions within a 492 foot radius. This threshold applies to all types of emissions within 1,000 feet. In modeling applications for proposed projects, a larger radius results in a greater number of sources considered and higher modeled concentrations. On balance, the Air District estimates that the SFDPH threshold and this one, in combination with the individual source threshold for PM_{2.5}, will afford similar levels of health protection.

The cumulative PM_{2.5} threshold represents the middle range of an EPA proposed Significant Impact Level (SIL). EPA interprets the SIL to be the level of ambient impact that is considered to represent a "significant contribution" to regional non-attainment. While this threshold was not designed to be a threshold for assessing community risk and hazards, it was designed to protect public health at a regional level by helping an area maintain the NAAQS. Since achieving and



maintaining state and federal AAQS is a reasonable goal at the local scale, the SIL provides a useful reference for comparison. Furthermore, the $0.8 \mu\text{g}/\text{m}^3$ threshold is consistent with studies (Kleinman et al 2007) that examined the potential health impacts of roadway particles.

3.2.4. Plan-Level Risk and Hazard Thresholds

Staff proposes plan-level thresholds that will encourage a programmatic approach to addressing the overall adverse conditions resulting from risks and hazards that many Bay Area communities experience. By designating overlay zones in land use plans, local land use jurisdictions can take preemptive action before project-level review to reduce the potential for significant exposures to risk and hazard emissions. While this will require more up-front work at the general plan level, in the long-run this approach is a more feasible approach consistent with Air District and CARB guidance about siting sources and sensitive receptors that is more effective than project by project consideration of effects that often has more limited mitigation opportunities. This approach would also promote more robust cumulative consideration of effects of both existing and future development for the plan-level CEQA analysis as well as subsequent project-level analysis.

For local plans to have a less-than-significant impact with respect to potential risks and hazards, overlay zones would have to be established around existing and proposed land uses that would emit these air pollutants. Overlay zones to avoid risk impacts should be reflected in local plan policies, land use map(s), and implementing ordinances (e.g., zoning ordinance). The overlay zones around existing and future risk sources would be delineated using the quantitative approaches described above for project-level review and the resultant risk buffers would be included in the General Plan (or the EIR for the General Plan) to assist in site planning. BAAQMD will provide guidance as to the methods used to establish the TAC buffers and what standards to be applied for acceptable exposure level in the updated CEQA Guidelines document. Special overlay zones of at least 500 feet (or an appropriate distance determined by modeling and approved by the Air District) on each side of all freeways and high volume roadways would be included in this threshold.

The threshold of significance for plan impacts could affect all plan adoptions and amendments and require mitigation for a plan's air quality impacts. Where sensitive receptors would be exposed above the acceptable exposure level, the plan impacts would be considered significant and mitigation would be required to be imposed either at the plan level (through policy) or at the project level (through project level requirements).

3.2.5. Community Risk Reduction Plans

The goal of a Community Risk Reduction Plan would be to bring TAC and $\text{PM}_{2.5}$ concentrations for the entire community covered by the Plan down to acceptable levels as identified by the local jurisdiction and approved by the Air District. This approach provides local agencies a proactive alternative to addressing communities with high levels of risk on a project-by-project approach. This approach is supported by CEQA Guidelines Section 15030(a)(3), which provides that a project's contribution to a cumulative problem can be less than cumulatively considerable "if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact." This approach is also further supported by CEQA Guidelines Section 15064(h)(3), which provides that a project's contribution to a cumulative effect is not considerable "if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem."



Qualified Community Risk Reduction Plans

- (A) A qualified Community Risk Reduction Plan adopted by a local jurisdiction should include, at a minimum, the following elements. The District's revised CEQA Guidelines provides the methodology to determine if a Community Risk Reduction Plan meets these requirements. Define a planning area;
- (B) Include base year and future year emissions inventories of TACs and PM2.5;
- (C) Include Air District–approved risk modeling of current and future risks;
- (D) Establish risk and exposure reduction goals and targets for the community in consultation with Air District staff;
- (E) Identify feasible, quantifiable, and verifiable measures to reduce emissions and exposures;
- (F) Include procedures for monitoring and updating the inventory, modeling and reduction measures in coordination with Air District staff;
- (G) Be adopted in a public process following environmental review.



4. CRITERIA POLLUTANT THRESHOLDS

4.1. THRESHOLDS OF SIGNIFICANCE

Project Construction	
Pollutant	Average Daily (pounds/day)
ROG (reactive organic gases)	54
NO _x (nitrogen oxides)	54
PM ₁₀ (exhaust) (particulate matter-10 microns)	82
PM _{2.5} (exhaust) (particulate matter-2.5 microns)	54
PM ₁₀ /PM _{2.5} (fugitive dust)	Best Management Practices
Local CO (carbon monoxide)	None

Project Operations		
Pollutant	Average Daily (pounds/day)	Maximum Annual (tons/year)
ROG	54	10
NO _x	54	10
PM ₁₀	82	15
PM _{2.5}	54	10
Local CO	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	

Plans
1. Consistency with Current Air Quality Plan control measures 2. Projected VMT or vehicle trip increase is less than or equal to projected population increase

Regional Plans (Transportation and Air Quality Plans)
No net increase in emissions of criteria air pollutants and precursors

4.2. JUSTIFICATION AND SUBSTANTIAL EVIDENCE SUPPORTING THRESHOLDS

4.2.1. Project Construction Criteria Pollutant Thresholds

Staff proposes criteria pollutant construction thresholds that add significance criteria for exhaust emissions to the existing fugitive dust criteria employed by the Air District. While our current Guidelines considered construction exhaust emissions controlled by the overall air quality plan, the implementation of new and more stringent state and federal standards over the past ten years now warrants additional control of this source of emissions.

The average daily criteria air pollutant and precursor emission levels shown above are recommended as the thresholds of significance for construction activity for exhaust emissions. These thresholds represent the levels above which a project's individual emissions would result in a considerable contribution (i.e., significant) to the SFBAAB's existing non-attainment air quality



conditions and thus establish a nexus to regional air quality impacts that satisfies CEQA requirements for evidence-based determinations of significant impacts.

For fugitive dust emissions, staff recommends following the current best management practices approach which has been a pragmatic and effective approach to the control of fugitive dust emissions. Studies have demonstrated (Western Regional Air Partnership, U.S.EPA) that the application of best management practices at construction sites have significantly controlled fugitive dust emissions. Individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to more than 90 percent. In the aggregate best management practices will substantially reduce fugitive dust emissions from construction sites. These studies support staff's recommendation that projects implementing construction best management practices will reduce fugitive dust emissions to a less than significant level.

4.2.2. Project Operation Criteria Pollutant Thresholds

The thresholds for project operations are the average daily and maximum annual criteria air pollutant and precursor levels shown above. These thresholds are based on the federal BAAQMD Offset Requirements to ozone precursors for which the SFBAAB is designated as a non-attainment area which is an appropriate approach to prevent further deterioration of ambient air quality and thus has nexus and proportionality to prevention of a regionally cumulative significant impact (e.g. worsened status of non-attainment). Despite non-attainment area for state PM₁₀ and pending nonattainment for federal PM_{2.5}, the federal NSR Significant Emission Rate annual limits of 15 and 10 tons per year, respectively, are the thresholds as BAAQMD has not established an Offset Requirement limit for PM_{2.5} and the existing limit of 100 tons per year is much less stringent and would not be appropriate in light of our pending nonattainment designation for the federal 24-hour PM_{2.5} standard. These thresholds represent the emission levels above which a project's individual emissions would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. The thresholds would be an evaluation of the incremental contribution of a project to a significant cumulative impact. These threshold levels are well-established in terms of existing regulations as promoting review of emissions sources to prevent cumulative deterioration of air quality. Using existing environmental standards in this way to establish CEQA thresholds of significance under Guidelines section 15067.4 is an appropriate and effective means of promoting consistency in significance determinations and integrating CEQA environmental review activities with other areas of environmental regulation. (See *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal. App. 4th 98, 111.¹⁰)

4.2.3. Local Carbon Monoxide Thresholds

The carbon monoxide thresholds are based solely on ambient concentration limits set by the California Clean Air Act for Carbon Monoxide and Appendix G of the State of California CEQA Guidelines.

Since the ambient air quality standards are health-based (i.e., protective of public health), there is substantial evidence (i.e., health studies that the standards are based on) in support of their use

¹⁰ The Court of Appeal in the *Communities for a Better Environment* case held that existing regulatory standards could not be used as a definitive determination of whether a project would be significant under CEQA where there is substantial evidence to the contrary. Staff's thresholds would not do that. The thresholds are levels at which a project's emissions would normally be significant, but would not be binding on a lead agency if there is contrary evidence in the record.



as CEQA significance thresholds. The use of the ambient standard would relate directly to the CEQA checklist question. By not using a proxy standard, there would be a definitive bright line about what is or is not a significant impact and that line would be set using a health-based level.

The CAAQS of 20.0 ppm and 9 ppm for 1-hour and 8-hour CO, respectively, would be used as the thresholds of significance for localized concentrations of CO. Carbon monoxide is a directly emitted pollutant with primarily localized adverse effects when concentrations exceed the health based standards established by the California Air Resources Board (ARB).

In addition, Appendix G of the State of California CEQA Guidelines includes the checklist question: Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation? Answering yes to this question would indicate that the project would result in a significant impact under CEQA. The use of the ambient standard would relate directly to this checklist question.

4.2.4. Plan-Level Criteria Pollutant Thresholds

This threshold achieves the same goals as the Air District's current approach while alleviating the existing analytical difficulties and the inconsistency of comparing a plan update with AQP growth projections that may be up to several years old. Eliminating the analytical inconsistency provides better nexus and proportionality for evaluating air quality impacts for plans.

Over the years staff has received comments on the difficulties inherent in the current approach regarding the consistency tests for population and VMT growth. First, the population growth estimates used in the most recent AQP can be up to several years older than growth estimates used in a recent plan update, creating an inconsistency in this analysis. Staff recommends that this test of consistency be eliminated because the Air District and local jurisdictions all use regional population growth estimates that are disaggregated to local cities and counties. In addition, the impact to air quality is not necessarily growth but where that growth is located. The second test, rate of increase in vehicle use compared to growth rate, will determine if planned growth will impact air quality. Compact infill development inherently has less vehicle travel and more transit opportunities than suburban sprawl.

Second, the consistency test of comparing the rate of increase in VMT to the rate of increase in population has been problematic at times for practitioners because VMT is not always available with the project analysis. Staff recommends that either the rate of increase in VMT or vehicle trips be compared to the rate of increase in population. Staff also recommends that the growth estimates used in this analysis be for the years covered by the plan. Staff also recommends that the growth estimates be obtained from the Association of Bay Area Governments since the Air District uses ABAG growth estimates for air quality planning purposes.

4.2.5. Criteria Pollutant Thresholds for Regional Plans

Regional plans include the Regional Transportation Plan prepared by the Metropolitan Transportation Commission (MTC) and air quality plans prepared by the Air District.

The Regional Transportation Plan (RTP), also called a Metropolitan Transportation Plan (MTP) or Long-Range Transportation Plan is the mechanism used in California by both Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPAs) to conduct long-range (minimum of 20 years) planning in their regions. MTC functions as both the regional transportation planning agency, a state designation, and, for federal purposes, as the region's metropolitan planning organization (MPO). As such, it is responsible for regularly updating the Regional Transportation Plan, a comprehensive blueprint for the development of



comprehensive transportation system that includes mass transit, highway, airport, seaport, railroad, bicycle and pedestrian facilities. The performance of this system affects such public policy concerns as air quality, environmental resource consumption, social equity, “smart growth,” economic development, safety, and security. Transportation planning recognizes the critical links between transportation and other societal goals. The planning process requires developing strategies for operating, managing, maintaining, and financing the area’s transportation system in such a way as to advance the area’s long-term goals.

The Air District periodically prepares and updates plans to achieve the goal of healthy air. Typically, a plan will analyze emissions inventories (estimates of current and future emissions from industry, motor vehicles, and other sources) and combine that information with air monitoring data (used to assess progress in improving air quality) and computer modeling simulations to test future strategies to reduce emissions in order to achieve air quality standards. Air quality plans usually include measures to reduce air pollutant emissions from industrial facilities, commercial processes, motor vehicles, and other sources. Bay Area air quality plans are prepared with the cooperation of MTC and the Association of Bay Area Governments (ABAG).

The threshold of significance for regional plans is no net increase in emissions including criteria pollutant emissions. This threshold serves to answer the State CEQA Guidelines Appendix G sample question: “Would the project Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?”

5. ODOR THRESHOLDS

5.1. THRESHOLDS OF SIGNIFICANCE

Project Operations – Source or Receptor	Plans
Five confirmed complaints per year averaged over three years	Identify the location, and include policies to reduce the impacts, of existing or planned sources of odors

5.2. JUSTIFICATION AND SUBSTANTIAL EVIDENCE SUPPORTING THRESHOLDS

Staff proposes revising the current CEQA significance threshold for odors to be consistent with the Air District’s regulation governing odor nuisances (Regulation 7—Odorous Substances). The current approach includes assessing the number of unconfirmed complaints which are not considered indicative of actual odor impacts. Basing the threshold on an average of five confirmed complaints per year over a three year period reflects the most stringent standards derived from the Air District rule and is therefore considered an appropriate approach to a CEQA evaluation of odor impacts.

Odors are generally considered a nuisance, but can result in a public health concern. Some land uses that are needed to provide services to the population of an area can result in offensive odors, such as filling portable propane tanks or recycling center operations. When a proposed project includes the siting of sensitive receptors in proximity to an existing odor source, or when siting a new source of potential odors, the following qualitative evaluation should be performed.



When determining whether potential for odor impacts exists, it is recommended that Lead Agencies consider the following factors and make a determination based on evidence in each qualitative analysis category:

Distance: Use the screening-level distances in Table 9.

Wind Direction: Consider whether sensitive receptors are located upwind or downwind from the source for the most of the year. If odor occurrences associated with the source are seasonal in nature, consider whether sensitive receptors are located downwind during the season in which odor emissions occur.

Complaint History: Consider whether there is a history of complaints associated with the source. If there is no complaint history associated with a particular source (perhaps because sensitive receptors do not already exist in proximity to the source), consider complaint-history associated with other similar sources in BAAQMD's jurisdiction with potential to emit the same or similar types of odorous chemicals or compounds, or that accommodate similar types of processes.

Character of Source: Consider the character of the odor source, for example, the type of odor events according to duration of exposure or averaging time (e.g., continuous release, frequent release events, or infrequent events).

Exposure: Consider whether the project would result in the exposure of a substantial number of people to odorous emissions.

Type of Operation Project Screening	Distance
Wastewater Treatment Plant	2 miles
Wastewater Pumping Facilities	1 mile
Sanitary Landfill	2 miles
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	2 miles
Chemical Manufacturing	2 miles
Fiberglass Manufacturing	1 mile
Painting/Coating Operations	1 mile
Rendering Plant	2 miles
Food Processing Facility	1 mile
Confined Animal Facility/Feed Lot/Dairy	1 mile
Green Waste and Recycling Operations	1 mile
Coffee Roaster	1 mile



California Integrated Waste Management Board (CIWMB). Facilities that are regulated by the CIWMB (e.g. landfill, composting, etc.) are required to have Odor Impact Minimization Plans (OIMP) in place and have procedures that establish fence line odor detection thresholds. The Air District recognizes a Lead Agency's discretion under CEQA to use established odor detection thresholds as thresholds of significance for CEQA review for CIWMB regulated facilities with an adopted OIMP.



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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

RESOLUTION No. 2010-06

A Resolution of the Board of Directors of the Bay Area Air Quality Management District Adopting Thresholds For Use In Determining the Significance of Projects' Environmental Effects Under the California Environmental Quality Act

WHEREAS, pursuant to Title 14, Chapter 3, Article 5, Section 15064.7 of the California Code of Regulations ("Section 15064.7"), the California Resources Agency encourages public agencies to adopt "Thresholds of Significance" under the California Environmental Quality Act ("CEQA");

WHEREAS, pursuant to Section 15064.7, CEQA Thresholds of Significance are identifiable quantitative, qualitative or performance levels of a particular environmental effect, non-compliance with which means the effect will normally be determined to be "significant" under CEQA, and compliance with which means the effect normally will be determined to be less than significant under CEQA;

WHEREAS, the Board of Directors ("Board") of the Bay Area Air Quality Management District ("District") finds it necessary and appropriate to adopt CEQA Thresholds of Significance as set forth in Attachment A hereto for use by District staff and by other appropriate agencies in determining whether projects may have significant effects on the environment for purposes of CEQA environmental analyses;

WHEREAS, the CEQA Thresholds of Significance as set forth in Attachment A hereto do not alter the existing procedural and substantive requirements of CEQA under California law, but simply clarify the level at which, in the District's considered opinion, an environmental effect should normally be considered "significant" for purposes of existing CEQA law;

WHEREAS, the CEQA Thresholds of Significance set forth in Attachment A hereto were developed through an extensive public review process, which included public workshops, Board meetings and meetings with local government agency and non-government organization staff, including the cities of Berkeley, Colma, Daly City, Dublin, Fremont, Livermore, Oakland, Pleasanton, Richmond, San Leandro, San Mateo, San Francisco and Santa Rosa; the counties of Alameda, Contra Costa, Napa, Santa Clara, and Sonoma; and the CARE Task Force, the Alameda County Planning for Healthy Communities Network and the Governor's Office of Planning and Research Local Government Roundtable;

WHEREAS, District staff held ten public workshops throughout the Bay Area on February 26, 2009, April 27, 29 and 30, 2009, September 8, 9, and 10, 2009, October 2, 2009, and April 15 and 26, 2010; solicited Thresholds of Significance options for consideration; and published for public review and comment the Threshold Options Report on April 24, 2009, the CEQA Thresholds Options and Justification Report on October 8, 2009, and the Proposed Thresholds of Significance Report on November 2, 2009, December 7, 2009 and May 3, 2010;



meetings were held on November 18, 2009, December 2, 2009, January 6, 2010, May 5, 2010 and June 2, 2010;

WHEREAS, at the November 18, 2009, December 2, 2009, January 6, 2010, May 5, 2010 and June 2, 2010 public meetings, the subject matter of the Thresholds of Significance was discussed with interested persons in accordance with all provisions of law;

WHEREAS, the November 18, 2009, December 2, 2009, January 6, 2010, May 5, 2010 and June 2, 2010 public meetings and the other public review opportunities that the District has provided regarding the Thresholds of Significance, constitute a public review process as required by Section 15064.7;

WHEREAS, District staff has prepared and presented to this Board the May 3, 2010, Proposed Thresholds of Significance report, which has been considered by this Board and is incorporated herein by reference;

WHEREAS, the documents and other materials that constitute the record of the public review process under Section 15064.7 on which this Resolution is based are located at the Bay Area Air Quality Management District, 939 Ellis Street, San Francisco, 94109, and the custodian for these documents is Ms. Lisa Harper, Clerk of the Boards;

WHEREAS, District staff recommends adoption of the CEQA Thresholds of Significance set forth in Attachment A hereto;

WHEREAS, the Board of Directors concurs with District staff's recommendations and desires to adopt the CEQA Thresholds of Significance set forth in Attachment A hereto;

NOW, THEREFORE, BE IT RESOLVED that that the Board of Directors of the Bay Area Air Quality Management District does hereby adopt the CEQA Thresholds of Significance, pursuant to the authority granted by law, as set forth in Attachment A hereto, and discussed in the Proposed Thresholds of Significance report dated May 3, 2010, with instructions to staff to correct any typographical or formatting errors before final publication of the CEQA Thresholds of Significance.

BE IT FURTHER RESOLVED that it is the policy of the Bay Area Air Quality Management District that projects that do not comply with the CEQA Thresholds of Significance will normally be determined to have a significant effect on the environment for purposes of CEQA, and projects that comply with the CEQA Thresholds of Significance normally will be determined to have a less-than-significant effect on the environment for purposes of CEQA.

BE IT FURTHER RESOLVED that it is the policy of the Bay Area Air Quality Management District that Lead Agencies in the Bay Area apply the CEQA Thresholds of Significance, except for the Risk and Hazard thresholds for Receptor Projects, for Notices of Preparation issued, and environmental analyses begun, on or after the date of adoption of this Resolution.

BE IT FURTHER RESOLVED that it is the policy of the Bay Area Air Quality Management District that Lead Agencies in the Bay Area apply the CEQA Thresholds of Significance for the



Risk and Hazard thresholds for Receptor Projects for Notices of Preparation issued, and environmental analyses begun, after January 1, 2011.

The foregoing Resolution was duly and regularly introduced, passed and adopted at a regular meeting of the Board of Directors of the Bay Area Air Quality Management District on the Motion of Director KALRA, seconded by Director UULKEMA, on the 2nd day of JUNE, 2010, by the following vote of the Board:

AYES: BATES, GARNER, GIOIA, GROOM, HOSTERMAN, HUDSON, KALRA, MAR, ROSS, SPERING, TORLIATT, UULKEMA, YEAGER, WAGENKNECHT

NOES: NONE

RECUSED: HAGGERTY

ABSENT: BROWN, DALY, DUNNIGAN, KLATT, KNISS, MILEY, ZANE

Brad Wagenknecht
Chairperson of the Board of Directors

ATTEST:

John Gioia
Secretary of the Board of Directors



ATTACHMENT A

Proposed Air Quality CEQA Thresholds of Significance (May 3, 2010)			
Pollutant	Construction-Related	Operational-Related	
Project-Level			
Criteria Air Pollutants and Precursors (Regional)	Average Daily Emissions (lb/day)	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀ (exhaust)	82	82	15
PM _{2.5} (exhaust)	54	54	10
PM ₁₀ /PM _{2.5} (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	
GHGs Projects other than Stationary Sources	None	Compliance with Qualified Greenhouse Gas Reduction Strategy OR 1,100 MT of CO ₂ e/yr OR 4.6 MT CO ₂ e/SP/yr (residents + employees)	
GHGs Stationary Sources	None	10,000 MT/yr	
Risks and Hazards – New Source (Individual Project)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor	
Risks and Hazards – New Receptor (Individual Project)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient PM _{2.5} increase: > 0.3 µg/m ³ annual average <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor	
Risks and Hazards – New Source (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM _{2.5} : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor	



Proposed Air Quality CEQA Thresholds of Significance (May 3, 2010)		
Pollutant	Construction-Related	Operational-Related
Risks and Hazards – New Receptor (Cumulative Thresholds)	Same as Operational Thresholds*	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10.0 Hazard Index (from all local sources) (Chronic) PM _{2.5} : > 0.8 µg/m ³ annual average (from all local sources) <u>Zone of Influence:</u> 1,000-foot radius from fence line of source or receptor
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous materials locating near receptors or receptors locating near stored or used acutely hazardous materials considered significant
Odors	None	Complaint History—5 confirmed complaints per year averaged over three years
Plan-Level		
Criteria Air Pollutants and Precursors	None	1. Consistency with Current Air Quality Plan control measures 2. Projected VMT or vehicle trip increase is less than or equal to projected population increase
GHGs	None	Compliance with Qualified Greenhouse Gas Reduction Strategy (or similar criteria included in a General Plan) OR 6.6 MT CO ₂ e/ SP/yr (residents + employees)
Risks and Hazards	None	1. Overlay zones around existing and planned sources of TACs (including adopted Risk Reduction Plan areas) 2. Overlay zones of at least 500 feet (or Air District-approved modeled distance) from all freeways and high volume roadways
Odors	None	Identify locations of odor sources in general plan
Accidental Release of Acutely Hazardous Air Pollutants	None	None
Regional Plans (Transportation and Air Quality Plans)		
GHGs, Criteria Air Pollutants and Precursors, and Toxic Air Contaminants	None	No net increase in emissions
<p>Notes: CO = carbon monoxide; CO₂e = carbon dioxide equivalent; GHGs = greenhouse gases; lb/day = pounds per day; MT = metric tons; NO_x = oxides of nitrogen; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppm = parts per million; ROG = reactive organic gases; SP = service population; tpy = tons per year; yr = year.</p> <p>* Note: The Air District recommends that for construction projects that are less than one year duration, Lead Agencies should annualize impacts over the scope of actual days that peak impacts are to occur, rather than the full year.</p>		



E. GLOSSARY

Aerosol -- Particle of solid or liquid matter that can remain suspended in the air because of its small size (generally under one micrometer in diameter).

Air Quality Management District (AQMD) -- Local agency charged with controlling air pollution and attaining air quality standards. The Bay Area Air Quality Management District is the regional AQMD that includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara Counties and the southern halves of Solano and Sonoma Counties.

Air Resources Board (ARB) -- The State of California agency responsible for air pollution control. Responsibilities include: establishing State ambient air quality standards, setting allowable emission levels for motor vehicles in California and oversight of local air quality management districts.

Area Sources -- Sources of air pollutants that individually emit relatively small quantities of air pollutants, but that may emit considerable quantities of emissions when aggregated over a large area. Examples include water heaters, lawn maintenance equipment, and consumer products.

Best Available Control Technology (BACT) -- The most stringent emissions control that has been achieved in practice, identified in a state implementation plan, or found by the District to be technologically feasible and cost-effective for a given class of sources.

California Clean Air Act (CCAA) -- Legislation enacted in 1988 mandating a planning process to attain state ambient air quality standards.

CALINE -- A model developed by the Air Resources Board that calculates carbon monoxide concentrations resulting from motor vehicle use.

Carbon Monoxide (CO) -- A colorless, odorless, toxic gas produced by the incomplete combustion of carbon-containing substances. It is emitted in large quantities by exhaust of gasoline-powered vehicles.

Carbon Dioxide (CO₂) -- A colorless, odorless gas that is an important contributor to Earth's greenhouse effect.

Carbon Dioxide Equivalent (CO₂E) -- A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

Chlorofluorocarbons (CFCs) -- A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. CFCs drift into the upper atmosphere where their chlorine components destroy stratospheric ozone.

Clean Air Act (CAA) -- Long-standing federal legislation, last amended in 1990, that is the legal basis for the national clean air programs.



Conformity -- A requirement in federal law and administrative practice that requires that projects will not be approved if they do not conform with the State Implementation Plan by: causing or contributing to an increase in air pollutant emissions, violating an air pollutant standard, or increasing the frequency of violations of an air pollutant standard.

Criteria Air Pollutants -- Air pollutants for which the federal or State government has established ambient air quality standards, or criteria, for outdoor concentration in order to protect public health. Criteria pollutants include: ozone, carbon monoxide, sulfur dioxide PM10 (previously total suspended particulate), nitrogen oxide, and lead.

EMFAC -- The computer model developed by the California Air Resources Board to estimate composite on-road motor vehicle emission factors by vehicle class.

Emission Factor -- The amount of a specific pollutant emitted from a specified polluting source per unit quantity of material handled, processed, or burned.

Emission Inventory -- A list of air pollutants emitted over a determined area by type of source. Typically expressed in mass per unit time.

Environmental Protection Agency (EPA) -- The federal agency responsible for control of air and water pollution, toxic substances, solid waste, and cleanup of contaminated sites.

Exceedance -- A monitored level of concentration of any air contaminant higher than national or state ambient air quality standards.

Global Warming Potential (GWP) -- The index used to translate the level of emissions of various gases into a common measure in order to compare the relative radiative forcing of different gases without directly calculating the changes in atmospheric concentrations. GWPs are calculated as the ratio of the radiative forcing that would result from the emissions of one kilogram of a greenhouse gas to that from emission of one kilogram of carbon dioxide over a period of time (usually 100 years).

Greenhouse Gas (GHG) -- Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated fluorocarbons (HCFCs), ozone (O₃), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆) and hydrofluorocarbons (HFCs).

Hazardous Air Pollutants -- Federal terminology for air pollutants which are not covered by ambient air quality standards but may reasonably be expected to cause or contribute to serious illness or death (see NESHAPs).

Health Risk Assessment -- An analysis where human exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risk.

Hot Spot -- A location where emissions from specific sources may expose individuals and population groups to elevated risks of adverse health effects and contribute to the cumulative health risks of emissions from other sources in the area.

Hydrogen Sulfide (H₂S) -- A gas characterized by "rotten egg" smell, found in the vicinity of oil refineries, chemical plants and sewage treatment plants.



Impacted Communities – Also known as priority communities, the Air District defines impacted communities within the Bay Area as having higher emitting sources, highest air concentrations, and nearby low income and sensitive populations. The Air District identified the following impacted communities: the urban core areas of Concord, eastern San Francisco, western Alameda County, Redwood City/East Palo Alto, Richmond/San Pablo, and San Jose.

Indirect Sources – Land uses and facilities that attract or generate motor vehicle trips and thus result in air pollutant emissions, e.g., shopping centers, office buildings, and airports.

Inversion -- The phenomenon of a layer of warm air over cooler air below. This atmospheric condition resists the natural dispersion and dilution of air pollutants.

Level of Service (LOS) -- A transportation planning term for a method of measurement of traffic congestion. The LOS compares actual or projected traffic volume to the maximum capacity of the road under study. LOS ranges from A through F. LOS A describes free flow conditions, while LOS F describes the most congested conditions, up to or over the maximum capacity for which the road was designed.

Mobile Source -- Any motor vehicle that produces air pollution, e.g., cars, trucks, motorcycles (on-road mobile sources) or airplanes, trains and construction equipment (off-road mobile sources).

National Ambient Air Quality Standards (NAAQS) -- Health-based pollutant concentration limits established by EPA that apply to outdoor air (see Criteria Air Pollutants).

National Emissions Standards for Hazardous Air Pollutants (NESHAPs) – Emissions standards set by EPA for air pollutants not covered by NAAQS that may cause an increase in deaths or in serious, irreversible, or incapacitating illness.

Nitrogen Oxides (NO_x) -- Gases formed in great part from atmospheric nitrogen and oxygen when combustion takes place under conditions of high temperature and high pressure; NO_x is a precursor to the criteria air pollutant ozone.

Nonattainment Area -- Defined geographic area that does not meet one or more of the

Ambient Air Quality Standards for the criteria pollutants designated in the federal Clean Air Act and/or California Clean Air Act.

Ozone (O₃) -- A pungent, colorless, toxic gas. A product of complex photochemical processes, usually in the presence of sunlight. Tropospheric (lower atmosphere) ozone is a criteria air pollutant.

Particulate -- A particle of solid or liquid matter; soot, dust, aerosols, fumes and mists.

Photochemical Process -- The chemical changes brought about by the radiant energy of the sun acting upon various polluting substances. The products are known as photochemical smog.

PM_{2.5} -- Fine particulate matter (solid or liquid) with an aerodynamic diameter equal to or less than 2.5 micrometers. Individual particles of this size are small enough to be inhaled deeply into the lungs..



PM₁₀ -- Fine particulate matter (solid or liquid) with an aerodynamic diameter equal to or less than 10 micrometers. Individual particles of this size are small enough to be inhaled into human lungs; they are not visible to the human eye.

Precursor -- Compounds that change chemically or physically after being emitted into the air and eventually produce air pollutants. For example, organic compounds are precursors to ozone.

Prevention of Significant Deterioration (PSD) -- EPA program in which State and/or federal permits are required that are intended to restrict emissions for new or modified sources in places where air quality is already better than required to meet primary and secondary ambient air quality standards.

Reactive Organic Gases (ROG) -- Classes of organic compounds, especially olefins, substituted aromatics and aldehydes, that react rapidly in the atmosphere to form photochemical smog or ozone.

Sensitive Receptors -- Facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals and residential areas.

State Implementation Plan (SIP) -- EPA-approved state plans for attaining and maintaining federal air quality standards.

Stationary Source -- A fixed, non-mobile source of air pollution, usually found at industrial or commercial facilities.

Sulfur Oxides (SO_x) -- Pungent, colorless gases formed primarily by the combustion of sulfur-containing fossil fuels, especially coal and oil. Considered a criteria air pollutant, sulfur oxides may damage the respiratory tract as well as vegetation.

Toxic Air Contaminants -- Air pollutants which cause illness or death in relatively small quantities. Non-criteria air contaminants that, upon exposure, ingestion, inhalation, or assimilation into organisms either directly from the environment or indirectly by ingestion through food chains, may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, or physical deformations in such organisms or their offspring.

Transportation Control Measures (TCMs) -- Measures to reduce traffic congestion and decrease emissions from motor vehicles by reducing vehicle use.

URBEMIS -- A computer model developed by the California Air Resources Board to estimate air pollutant emissions from motor vehicle trips associated with land use development.

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Attachment H:

How is the SGI Mine Expansion Consistent with the 2016 General Plan?

Below are policies from the 2016 General Plan. Thoughtful explanations are necessary for the County to demonstrate that the proposed project conforms to these policies. Following each policy is a request for an explanation of how the proposed project conforms to the policy.

If the proposed project does not conform to policies in the 2016 General Plan, the County has the option to deny the proposed project or to amend the general plan. As explained in the 2016 General Plan on pages G-15 to G-16:

“[P]roposals which differ from the established general plan or zoning requirements must request to modify these standards. For instance, on the parcel above, if the property owner wished to construct a restaurant or service station, the parcel’s general plan designation and zoning district would first have to be changed. Such changes require approval by the Planning Commission and the Board of Supervisors, which is considered a legislative action. The Board and the Planning Commission would evaluate the proposal and make a decision whether or not to amend the general plan or zoning code, as well as whether to approve or deny the proposal based upon its merits, applying policies defined in the general plan and knowledge of local conditions and needs. This decision requires the Board and/or the Planning Commission to exercise considerable discretion, thus a disclosure of potential environmental impacts under CEQA and public hearings are required.”

2016 General Plan, p. LU-27

Policy LU-1.1: Protect existing land uses and public facilities from encroachment by incompatible land uses.

Please explain how a permitting a mine for an additional century to operate every day and night seven days per week, with its air pollution, public health, and water supply implications, is compatible with neighboring lands zoned for and use for residences and agriculture.

Policy LU-1.3: Encourage development patterns which support water quality objectives; protect agricultural land and natural resources; promote community identities; minimize environmental impacts; enable viable transit, bicycle and pedestrian transportation; reduce greenhouse gas emissions; and promote public health and wellness.

Please explain how a permitting a mine for an additional century to operate every day and night seven days per week using diesel machinery is consistent with reducing greenhouse gas (GHG)

emissions. An evaluation of GHG emissions is required by the Implementation Plan for the 2016 General Plan. (Implementation Plan, p. 18.) Please explain how permitting a mine for an additional century using groundwater, threatening an aquifer, and producing dust that harms crops is consistent with protecting neighboring agricultural lands.

2016 General Plan, p. LU-28

Policy LU-3.1: Ensure that effective public safety facilities, staffing, and equipment are provided to maintain service levels as the county's population and development change.

Please specify what sort of fire breaks or other facilities will be constructed and maintained between the mine and the City of Lone to ensure an effective level of public safety. The equipment and personnel needed to respond to a wildfire emergency are different and greater than the needs to put out a fire at a single family home. Is the project's funding of the local fire district sufficient to compensate for the project's increased burden on the district?

Policy LU-6.1: Ensure that new development is able to meet water supply, wastewater disposal, and public service standards.

Please explain how the permitting a mine for an additional century is consistent with meeting water supply public service standards, when the project is dependent on uncertain groundwater.

On page C-6, the 2016 General Plan confirms the uncertainty of local groundwater supplies, stating,

"Groundwater from individual wells represents a major water source in the county. In most of Amador County, groundwater-bearing units and aquifers are poorly defined. The majority of available groundwater is transient and found in fractured rock. This fractured bedrock aquifer has not been adequately studied, and no information is available concerning the capacity of the aquifer."

“The Cosumnes Groundwater Subbasin underlies southwestern Amador County. The Cosumnes Subbasin is in overdraft; in other words, more water is leaving the groundwater basin than entering it.”

2016 General Plan, p. LU-31

Policy LU-12.1: Ensure that appropriate levels of emergency services, including fire protection, can be demonstrated for new development.

Please explain how the Planning Commission determines the appropriate level of emergency services for a new development. What is the standard? Is it response time? Does it factor in the equipment or personnel needed to fight a wildland fire on the site? Does it factor in the presence of people in addition to property? How does the proposed project meet these standards? This evaluation is called for in the Implementation Plan. (Implementation Plan, p. 15.) This evaluation might have been easier had the service standards been completed. (See Implementation Plan, p. 9.)

Policy LU-12.3: Continue to ensure that the County’s development code addresses evacuation and emergency vehicle access, water supplies and fire flow, fuel modification for defensible space, and home addressing and signing.

How will the proposed project provide sufficient emergency water supplies for fighting fires? How will the proposed project address evacuation of employees and emergency vehicle access?

2016 General Plan, p. CM-11

Policy CM-1.1: The County’s Level of Service (LOS) standard is LOS C for rural roadways.

Does the County have peak period traffic counts on Highway 104? Shenandoah Road from tourist season (e.g. spring, summer, and fall) weekends? Was LOS C maintained? Will the proposed project substantially contribute to a failure to maintain LOS C? The County General Plan calls for the development of a nearby industrial park. The City of Lone General Plan calls for additional residential and commercial

development. We strongly recommend that the County complete a traffic impact study for the proposed project that includes the cumulative impacts of planned development. (See 2016 General Plan Implementation Plan, p. 16.) If not, how can the County demonstrate that the project is consistent with keeping the LOS at level C? While CEQA is phasing out the use of LOS for environmental impact reviews, the County's General Plan Standards of LOS C for health, safety, and general welfare still apply.

2016 General Plan, p. CM-12

Policy CM-1.2: Work with Caltrans and regional and local transportation agencies to address regional issues and opportunities related to growth, transportation financing and infrastructure, and other planning issues.

Has Caltrans or ACTC suggested any transportation improvements in the project area? If so, will the proposed project contribute to financing this infrastructure improvement? Isn't this just the type of opportunity "related to growth, transportation financing and infrastructure" that the County is supposed to work with Caltrans to grasp? If the county doesn't start collecting the money here and now, where and when will it do so?

2016 General Plan, p. CM-12

Policy CM-2.2: Identify key roads and intersections with historical or projected traffic congestion and/or safety problems and apply creative management measures to improve circulation.

Highway 104 through Lone has "historical or projected traffic congestion and/or safety problems." What "creative management measures" are the City, the County, Caltrans, and ACTC planning to do to address this concern?

2016 General Plan, p. E-26

Policy E-8 .3: Provide for and support value-added agricultural activities designed to provide an additional source of farming income while maintaining the land for viable agricultural production.

Please explain how permitting a mine for an additional century using groundwater, threatening an aquifer, and producing dust that harms crops is consistent supporting value-added agricultural activity and maintaining land for viable agricultural production. To conform to Policy E-8.3, shouldn't the limited water supply in the area be reserved for value-added agricultural activities? Please explain how the proposed project is consistent with Policy E-8.3.

2016 General Plan, p. E-26

Policy E-8 .1: Ensure future land uses are appropriately located and scaled to fit in with the county's rural and agricultural context.

Please explain how a project that leaves behind a man-made mountain 200-feet high, and a hole over 200 feet deep is "scaled to fit in" the County's rural and agricultural context. These dwarf other man-made structures in the County.

2016 General Plan, p. E-27

Policy E-9.5: Review future development for compatibility with existing adjacent and nearby agricultural uses.

Policy E-10.2: Support the continued availability of water supplies to agricultural users.

The proposed project threatens the shallow aquifer that supplies agriculture in the Lone Valley. The proposed project is dependent on groundwater from an over-drafted basin. The proposed project creates dust harmful to crops. Please explain how this is compatible with existing adjacent and nearby agricultural uses? Please explain how the project support the continued availability of water supplies to agricultural users.

Shouldn't groundwater supplies be conserved for agricultural users to comply with Policy E-10.2?

Doesn't the additional century of groundwater use and dust generation by the proposed project make it incompatible with adjacent and nearby agriculture?

Please explain how the proposed project is consistent with Policy E-9.5 and E-10.2.

Policy C-4.1: Encourage site plan elements in proposed development such as reduced pavement/cover and permeable pavement, as well as drainage features which limit runoff and increase infiltration and groundwater recharge.

2016 General Plan, p. C-25

Policy C-5.2: Encourage the use of LID strategies to help Amador County sustain and improve both surface- and groundwater quality.

Please explain which site plan elements and low impact development strategies referred to in Policies C-4.1 and C-5.2 are incorporated into the proposed project. Applying this policy might have been easier had the Zoning Code been amended on schedule. (Implementation Plan, pp. 4-5)

2016 General Plan, p. C-28

Policy C-9.4: Encourage energy conservation and energy efficient design in new development projects.

The proposed project will include additional outdoor lighting for night operations. Please identify the energy conservation and energy efficient design features in the proposed development making it consistent with Policy C-9.4.

Policy C-10.2: Develop and adopt a comprehensive strategy to reduce GHGs within Amador County by at least 15 percent from current levels by 2020.

Please state whether the County adopted the GHG reduction strategy and whether it has met the 15 percent reduction target in 2020.

According to page C-28 of the 2016 General Plan,

“The California Global Warming Solutions Act (AB 32) was passed in September 2006. AB 32 requires that statewide greenhouse gas (GHG) emissions must be reduced to 1990 levels by 2020. The Climate Change Scoping Plan (Scoping Plan) was

approved by ARB in December 2008 and outlines California's plan to achieve the GHG reductions required in AB 32. The Scoping Plan contains the primary strategies California will implement to achieve a reduction of 169 million metric tons of carbon dioxide equivalent, or approximately 28% from the state's projected 2020 emission levels. Future planning efforts that do not encourage reductions in GHG emissions would conflict with AB 32, impeding California's ability to comply.

"In the Scoping Plan, ARB encourages local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce GHGs. The Plan identifies California's cities and counties as "essential partners" within the overall statewide effort and recommends that local governments set a GHG reduction target of 15 percent below today's levels by the year 2020. Though the specific role local governments will play in meeting California's GHG reduction goals is still being defined, they will nonetheless be a key player.

"Statewide, more than 40% of GHG emissions are associated with transportation. Reduction of GHG emissions will thus primarily require a reduction of motor vehicle fuel consumed and vehicle miles traveled (VMT)."

According to page C-13 of the 2016 General Plan, "Air quality policies guide land use decisions, including, but not limited to decisions affecting proposed development projects and the location of new roads and transit facilities." The Implementation Plan indicates that the County will evaluate the GHG emissions from development proposals. (Implementation Plan, p. 18.)

Please explain how permitting for an additional century a mine operating diesel equipment and moving its product with trucks is consistent with the State and County policies to reduce GHG emissions?

2016 General Plan, p. S-18

Policy S-2.3: Incorporate fire safety site planning techniques within new development applications in high- or very-high fire risk areas. Encourage

building envelope or cluster development techniques to increase defensible areas.

Please identify which building requirements and site planning techniques referenced in Policy S-2.3 will be applied by the proposed project to reduce the risk of fire.

2016 General Plan, p. S-18

Policy S-2.2: Guide new development to areas where adequate fire protection, roads, and water service are available to support fire response.

Please identify the standards that apply for determining if “fire protection, roads, and water services are adequate to support fire response.” Please explain if and how the location of the proposed project meets those standards.

2016 General Plan, p. N-25

Policy N-1.1: Enforce noise standards to maintain acceptable noise limits, especially near noise-sensitive uses. Noise measurement methods are subject to County approval.

Please provide the results of noise monitoring from the mine operations over the last 31 years. Please identify efforts the County has taken to respond to noise complaints over that time. Please explain how the qualified County staff intends to measure noise and enforce noise standards at the mine at night and on weekends to conform to Policy N-1.1. If the County intends to permit operations for an additional century at night and on weekends, then the County also needs to monitor mitigation on nights and weekends.

Policy N-1.3: Evaluate potential noise conflicts for individual sites and projects, and require mitigation of all significant noise impacts (including construction and short-term noise impacts) as a condition of project approval.

Policy N-1.4: Protect existing areas with acceptable noise environments, and also those locations deemed “noise sensitive” from new noise sources.

Please identify the measures that will be used to reduce the noise impact of the proposed project to comply with Policies N-1.3 and N-1.4.

Colonel Fraser E. West U.S.M.C. (Ret)
By Teddy West, wife

This is the story of his life.

Fraser was born FRASER CRAWFORD EDWARDS in Washington D.C. in on March 1, 1918, the only son of a political journalist and beautiful socialite - Marguerite Simpson. When very young, he traveled West to Reno, Nevada with his Mother, who divorced, later marrying a beloved Reno surgeon Dr. Claudius Wilson West, who adopted Fraser as his only son, and thus Fraser changed his name to Fraser Edwards West.

From an early age, Fraser loved horses, and soon landed work at local ranches outside Reno, where he learned the cowboy arts of calf and team roping. I met Fraser when I was 5 and he was 12, when he bought two horses from my mother. He was a born leader in all activities in school. One of his favorite teachers taught extemporaneous speaking, and those skills stayed with him for life. In the winter, Fraser skied both alpine and cross country, ski jumped and helped put up the first rope tow at the first snow at the top of Mt. Rose south of Reno. Fraser taught my brother and I how to ski from this location when we were 10 and 12 years old. In high school, Fraser earned money after school hours caring for polo horses, learning to play polo as a benefit of that job.

Fraser turned down a chance to go to West Point after graduating from Reno High School, and instead entered the University of Nevada as an Agriculture and Animal Husbandry major. He became President of his fraternity, Sigma Alpha Epsilon during his senior year and a member of the Aggie Club and Blue Key. While in college, Fraser learned how to do snow surveying with his fraternity brother Wayne Poulsen - who later went on to purchase and found the Squaw Valley ski resort. Fraser was on the University of Nevada ski team. In those days, you had to be able to participate in ski jumping, cross country, slalom and downhill events. Fraser helped his team land the 1939 National Intercollegiate Ski Team Title and also participated in the World's Fair at Treasure Island, ski jumping with the team. As Captain in 1940, Fraser set a record for ski jumping 50 times in one day at Galena Creek at the foot of Mount Rose. After graduating from college, Fraser continued to work as a cowboy out on big ranches in Elko, Nevada.

In 1940, Fraser enlisted in the Marine Corps in San Francisco, and was immediately sent to Quantico, Virginia for officer candidate training under Colonel Lemuel Shepherd - who later became Commandant of the Marines Corps. During officer's training, Fraser also enjoyed playing polo with Shepherd. Fraser graduated in the First Candidates Class as a Second Lieutenant and then entered the Fourth Reserve Officers Class (ROC). He graduated February 1941 after surviving a skiing accident at Stowe, Vermont while on leave, which left with several broken vertebrae transverse processes. Once healed, he was now in the Fifth Reserve Officer's Class, with a regular officer commission.

Fraser was ordered to Camp Lejeune for field training and then subsequently to the Pacific. He participated in training in American and British Samoa and advanced from 1st Lt to Captain on Wallis Island. From there his company participated in the Battle of Guadalcanal. Forced to return to USA, he was home for Christmas with family and then reassigned back to the Pacific, as the Marines wanted combat trained leaders to train in New Zealand. He later landed in Bougainville as a rifle company Commanding Officer. From Bougainville, the Third Marine Division was sent back to Guadalcanal to train for Guam.

With the Third Marine Division, on July 25-26, 1944, Fraser was wounded in the Battle of Fonte Hill on Guam. His Silver Star citation reads that he saved his company by stepping in front of his tank to direct fire power due to a disabled phone on the tank. Pinned down by enemy fire for days, Fraser directed his men, and took risks to save lives. He was wounded, a bullet shattering his left femur and let himself be evacuated after his men were attended to first. For that action he was awarded the medal for valor and the Purple Heart. His Company had fought off seven chilling banzai attacks over a 3 day period. Defending against seven attacks of this kind is recorded as the most action ever seen then in the war in the Pacific. With him in battle were two future commandants of the Marine Corps, Colonel Louis Wilson fellow company Commander and Lt. Colonel Bob Cushman, his battalion Commander. Fraser is known as a key liberator of Guam, as hundreds of Guam citizens were marked for execution if the Marines had not landed and won the battle.

Back to the states for healing, Fraser and I married in Reno in 1945. Fraser began his stint as a Selective Service Liaison officer in Carson City, Nevada for a year. Back to active duty, he was ordered to China for a year, then to St. Louis, Mo for recruiting duty for three years. At that time, our oldest daughter Christina was born in 1947 and in 1950 our only son Bill.

Fraser was then assigned to Quantico for Senior School for six months. This training is to upgrade all senior officers, focusing in all leadership skills. He then became an instructor at the Basic School - to develop leadership in young officers. He was privileged to work with future Marine Corps Commandants - Colonel David Shoup and Colonel Lew Walt.

On his off time, Fraser wanted to ride and team rope, so helped design a rodeo arena for the First Military Rodeo for all services at the airport at Quantico. This Rodeo was open to all service members active as well as retired. Later, The Military Cowboys Association was formed at Camp Pendleton and in 1989 Fraser won the title of World Champion Team Roper in San Antonio, Texas, and again in 1991 in Palm Springs, California. He was known throughout the military at every base he served as "the daddy of service rodeos and horse-show exhibiting." He has been responsible for rodeo arenas being at Treasure Island, California, two in Hawaii, in Concord, and in Ione, California. For the rodeos, Fraser also did quite a bit of rodeo announcing. Audiences loved his beautiful voice and dry wit.

Our third child, daughter Caryn was born in 1952 in Washington D.C. - her father's birthplace.

From Quantico, he was then assigned to Korea with the First Division 2nd Battalion 7th Marine Regiment. As Division G-4, he was deeply involved in building the camp facilities at Pam Mujon for the exchange of North and South Korean Prisoners of War. This activity was known as Operation Big Switch which traded 200,000 people from both sides. Under General Pate, also a future commandant, he was picked to head the US 8th Army Ski Team to the Far East Ski Championships, Sapporo, Japan. Out of 75 teams participating, Fraser captained this ski team team, and he raced and ski jumped, and helped his team win Reserve Championship.

On his return Stateside in 1954, his orders were to serve in Honolulu with CINCPAC FLEET under Admiral Stump. His job took him on many trips to the Far East, writing plans for that area in case of war. In between his busy duty with family, friends who lent him horses for roping and once again Fraser designed and built a rodeo arena at Kaneohe which was named Fritz Truan arena - a former World Champion bronc rider, and a Marine Corps Iwo Jima hero. Fraser helped plan six Navy League rodeos at the gates of Pearl Harbor where Jim Arness was one of the guest TV stars. He shipped his skis to Hawaii and climbed up 14,000 ft slopes of Mona

Loa, and skied down. Our fourth child daughter Sandra Grace was born at Tripler Hospital overlooking Pearl Harbor in 1955.

In 1957, Fraser was ordered to the Naval Weapons Station (Port Chicago) in Concord California, as the Marines Corps Commander for the base. Fraser designed and built a rodeo arena, started roping again and outfitted the whole family - now with four children - with fire sale ski equipment in August. We traveled to Squaw Valley and built a cabin to use for the 1960 Olympics. All four of the children began ski racing, so Fraser and family commuted from Concord to the mountains 12 week-ends straight in the winter. Once promoted to he was assigned to the Marine Base at Treasure Island (a place he almost ski jumped off the scaffolding erected for the World's Fair--1939). He served as President of the Board for the Marines Memorial Club in San Francisco.

Fraser became a National Ski Patrolman and a National and International Technical Delegate (Judge) Badge to help the all racing programs. This position entailed checking the safety of the race helmets and making sure the children were well trained for the big races. He participated in avalanche control in Squaw Valley as well as an First Aid instructor. His activities included Chief of Race for the Special Olympics in Squaw Valley, Park City, Heavenly Valley and the Squaw Valley World Cups. He traveled to all major ski resorts in the USA, Canada and Europe...assisting at Masters Events all over the world. In 1958, Fraser broadcast the Grenoble Olympics for a San Francisco TV station. This initiated him into ski journalism.

For the 1960 Olympics, Fraser helped coordinate between the Military and the Olympic Committees. This included organizing soldiers to foot pack the snow slopes for the games as mechanical packing machines were not used at that time. In 1975, he was Transportation Chief for all the foreign delegates attending the San Francisco FIS Congress. His activities as a Technical Delegate (Judge) earned us both invitations to help on the Winter Olympic Games in 1980 (Lake Placid), 1988 (Calgary), and 2002 (Salt Lake City). He was very proud that one of his daughters, Caryn, won the 1969 Ladies Junior Combined Championship in Alaska and the World University Games championship in 1972 at Lake Placid.

In 1964, Fraser received orders to enable a promotion at Marines Corps Headquarters in Washington DC, but he would need to move his family. Our son Bill, had started in the Point One school system in California for the mentally handicapped, but Fraser's orders would have put us into Virginia schools - which were closed at the time due to the segregation problems. Bill continued well in his schooling in California and for that we are grateful. Choosing family over the military did shorten Fraser's 24 year military career and goal to achieve the rank of General, but Fraser was blessed to have worked with so many great Marines. 50 years later, Bill has finally been diagnosed correctly with Asperger's Syndrome, and we are so happy to have had him live with us all these years.

Out of the Marine Corps, Fraser became the Executive Director of the Far West Ski Association. In 1968, Fraser became the Mountain Manager for Squaw Valley, during one of the most severe winters in history. In 1969, he chaired the World Cup races at Squaw Valley. He also helped run the Cisco Grove ski resort for his fraternity brother Wayne Poulsen. Fraser was then hired to help develop the ski hill at the top of Donner summit now known as one of the most popular beginner slopes in the Sierra - Boreal ridge. He spent a year designing the runs commuting back to home in Concord on the week-ends.

For 13 years, Fraser was a Federation International Ski youth committee member. He was a Board Member of the U.S. Ski Association and the U.S. Ski Education Foundation, served on numerous Ski committees and past BOD Ski Hall of Fame. For all his work in skiing and volunteer work, he earned many high awards

In 1970, Fraser bought a custom horse trailer manufacturing plant called Trailer King, in Elk Grove, California. He and Bill commuted from Concord every day until Sandra was graduated from High school in 1973. In May of 1973, he bought Westhaven ranch in Ione on a handshake.

Fraser finally retired, closing the business closed in 1977. Since he was a team roper, he decided to raise his own cattle for roping, so began breeding registered Texas Long Horns, with one of the first herds in California. Soon satellite chapters of registered Texas Longhorns began to grow, and Fraser showed and hauled his cattle all over the West to compete, and win. He is known for his excellent breeding and after serving on the Texas Longhorn Board nine years, they named The Texas Twist events after him at the National and World Cup shows. In appreciation for his dedication to the preservation and promotion of the Texas Longhorn, he was awarded the TLBAA's highest award-- the Elmer Parker Award in 1997.

Fraser stopped skiing at 84 but continued to compete in team roping until he was 92, completing eighty years of rodeo events. His last ride was on a quarter horse named Cricket when he was 94. That same year, a San Francisco land developer tried to push a super polluting and unnecessary strip mine quarry and asphalt plant project onto agricultural land right behind Westhaven Ranch. With his youngest daughter Sandra (Sondra), he helped found the Ione Valley Land, Air & Water Defense Alliance (Ione Valley LAWDA) to provide a voice for all the ranchers, farmers, Castle Oaks residents and citizens of both the Ione Valley and City of Ione to oppose the project based on serious environmental concerns involving water, air quality, traffic, wildlife and rare plants and numerous other concerns. Last week, Fraser was very pleased that the project has been stopped but he wanted all involved to continue to oppose it.

Fraser and I have been married to me for almost 70 years now. We have known each other for 80 years and what a grand adventure it has been!

Fraser West passed away on January 2nd, 2015, at home, peacefully on his beloved Westhaven ranch. He is survived by his wife Teddy, their four children - Christina West, Bill West, Caryn West and Sondra West-Moore, and his grandchildren Alison Sudol, Anna Leia West and Iain West.

Services will be held Saturday January 24th at 4pm at the American Legion Hall – Post 108
Address: 11401 American Legion Drive, Sutter Creek, CA 95685
Phone:(209) 267-5764

Truly, a MAN OF ALL SEASONS

In lieu of flowers, donations in Fraser's name may be made to the American Legion of Amador County or to support the Ione Valley Land, Air & Water Defense Alliance (www.ionevalleylawda.com) which Fraser co-founded with daughter Sondra to further his dream of a clean environment and agricultural future for all in Amador County.

Honors as follows:

- 1971 United States Ski Association-----Paul Bacon Award for great contribution in race organization
- 1972 Far West ski Association -----outstanding ski official
- 1978 Hans George award---highest Far West Ski Association award

- 1993 Bud Little award-for contributing to USSA interests in FIS and Olympic events.
- 1994 USSA Julius Blegen ---highest award for outstanding ski services
- 1997 Texas Longhorns - TLBAA Elmer Parker award---highest award
- 2008 Hall of Fame—Amador County Fair—California
- 2012 – 8th (ever, since 1869) recipient of the DAR Lifetime Achievement Award for Leadership and Service

Resource Articles:

- 1956----Pro Rodeo Sports News—Fritz Truan arena—Oct. 1986
- 1978----Amador Ledger---Longhorns
- 1997----Texas Longhorn Trails---Dec.
- 2003----Calif. Texas Longhorn News---Fall---President
- 1998----Ropers News---oldest active team roper---80 years
- 2005----Leatherneck –July
- 2007----Texas Longhorn Trails---Sept---Elmer Parker Award
- 2008----Marine Corps Depot-Chevron—Feb-Parade honoring 90 birthday
- 2009---Sierra Sage---March---Picture of 1939 UN Ski Champions.

Life Member:

- | | |
|--|----------------------------|
| Episcopalian | PRCA---Gold Card Member |
| Republican | Texas Longhorn Association |
| Sigma Alpha Epsilon-Pres. Six yr | Far West ski Association |
| 1 st Marine Division | Kandahar Ski Club |
| 3 rd Marine Division | Us Team Roping Association |
| Purple Heart Society | |
| Marine Corps League | |
| Marines Memorial Club | |
| Golden Gate Chapter 3 rd USMC –former Pres. | |
| American Legion | |
| Veterans of Foreign Wars | |
| Disabled American Veterans | |
| US Ski Association | |
| Seniors in Retirement | |
| Red Cross Ski Patrol | |
| Calif. Texas Longhorn---past Pres. | |



Safety Data Sheet

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SECTION 1: Identification

1.1. Product identifier

3M Brand Roofing Granules - 9300P (Pittsboro, NC)

Product Identification Numbers

98-0213-4016-5

1.2. Recommended use and restrictions on use

Recommended use

Granules for coating roofing shingles.

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Industrial Mineral Products
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification

Carcinogenicity: Category 1A.

Specific Target Organ Toxicity (repeated exposure): Category 1.

2.2. Label elements

Signal word

Danger

Symbols

Health Hazard |

Pictograms



Hazard Statements

May cause cancer.

Causes damage to organs through prolonged or repeated exposure:
respiratory system |

Precautionary Statements

Prevention:

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapors/spray.
Do not eat, drink or smoke when using this product.
Wash thoroughly after handling.

Response:

IF exposed or concerned: Get medical advice/attention.

Storage:

Store locked up.

Disposal:

Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Meta-Andesite (composition varies naturally, typically contains feldspars, amphibole, pyroxene, chlorite and epidote)	Mixture	80 - 95
Quartz (a component of Meta-Andesite)	14808-60-7	5 - 15
Ceramic	66402-68-4	2 - 4
Titanium Dioxide	13463-67-7	0.1 - 1.0
Oil	64742-52-5	< 0.2

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:

Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact:

Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:

Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required

Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Non-combustible. Use a fire fighting agent suitable for surrounding fire.

5.2. Special hazards arising from the substance or mixture

None inherent in this product.

5.3. Special protective actions for fire-fighters

No special protective actions for fire-fighters are anticipated.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Ventilate the area with fresh air.

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Collect as much of the spilled material as possible. Use wet sweeping compound or water to avoid dusting. Sweep up. Place in a closed container approved for transportation by appropriate authorities. Clean up residue. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Use personal protective equipment (gloves, respirators, etc.) as required. Granules are not respirable. Dust generated during handling may contain respirable material. 3M does not recommend material handling methods that could damage the coating or base mineral. In particular, roofing granules should not be conveyed pneumatically, via screw conveyors, or used as a sand blasting media. These uses can cause coating and base mineral attrition which may lead to increased levels of dust generation. For industrial or professional use only.

7.2. Conditions for safe storage including any incompatibilities

No special storage requirements.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
Titanium Dioxide	13463-67-7	ACGIH	TWA:10 mg/m3	A4: Not class. as human carcin
Titanium Dioxide	13463-67-7	OSHA	TWA(as total dust):15 mg/m3	
Quartz (a component of Meta-Andesite)	14808-60-7	ACGIH	TWA(respirable fraction):0.025 mg/m3	A2: Suspected human carcin.
Quartz (a component of Meta-Andesite)	14808-60-7	OSHA	TWA Table Z-1(respirable):0.05 mg/m3;TWA Table Z-3(respirable):0.1 mg/m3	
Paraffin oil	64742-52-5	OSHA	TWA(as mist):5 mg/m3	
PETROLEUM DISTILLATES	64742-52-5	OSHA	TWA:2000 mg/m3(500 ppm)	

ACGIH : American Conference of Governmental Industrial Hygienists
 AIHA : American Industrial Hygiene Association
 CMRG : Chemical Manufacturer's Recommended Guidelines
 OSHA : United States Department of Labor - Occupational Safety and Health Administration
 TWA: Time-Weighted-Average
 STEL: Short Term Exposure Limit
 CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

Provide local exhaust ventilation at transfer points. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
 Safety Glasses with side shields

Skin/hand protection

No chemical protective gloves are required.

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:

Half facepiece or full facepiece air-purifying respirator suitable for particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form: Solid
Specific Physical Form: Granules

Odor, Color, Grade:	White color, slightly oily odor, typical particle size 0.84-2.0 mm
Odor threshold	<i>Not Applicable</i>
pH	[Details:CONDITIONS: SL BASIC] <i>Not Applicable</i>
Melting point	<i>Not Applicable</i>
Boiling Point	<i>Not Applicable</i>
Flash Point	No flash point
Evaporation rate	<i>Not Applicable</i>
Flammability (solid, gas)	Not Classified
Flammable Limits(LEL)	<i>Not Applicable</i>
Flammable Limits(UEL)	<i>Not Applicable</i>
Vapor Pressure	<i>Not Applicable</i>
Vapor Density	<i>Not Applicable</i>
Specific Gravity	2.75 - 2.90 [Ref Std:WATER=1]
Solubility In Water	<i>Not Applicable</i>
Solubility- non-water	<i>Not Applicable</i>
Partition coefficient: n-octanol/ water	<i>Not Applicable</i>
Autoignition temperature	<i>Not Applicable</i>
Decomposition temperature	<i>Not Applicable</i>
Viscosity	<i>Not Applicable</i>
Percent volatile	Nil

SECTION 10: Stability and reactivity

10.1. Reactivity

This material is considered to be non reactive under normal use conditions.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

<u>Substance</u>	<u>Condition</u>
None known.	

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

May cause additional health effects (see below).

Skin Contact:

Mechanical Skin irritation: Signs/symptoms may include abrasion, redness, pain, and itching.

Eye Contact:

Mechanical eye irritation: Signs/symptoms may include pain, redness, tearing and corneal abrasion.

Ingestion:

May be harmful if swallowed.

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Additional Health Effects:

Prolonged or repeated exposure may cause target organ effects:

Silicosis: Signs/symptoms may include breathlessness, weakness, chest pain, persistent cough, increased amounts of sputum, and heart disease.

Carcinogenicity:

Contains a chemical or chemicals which can cause cancer.

Ingredient	CAS No.	Class Description	Regulation
SILICA, CRYSTALS AIRRESP	14808-60-7	Known human carcinogen	National Toxicology Program Carcinogens
Quartz (a component of Meta-Andesite)	14808-60-7	Grp. 1: Carcinogenic to humans	International Agency for Research on Cancer
Titanium Dioxide	13463-67-7	Grp. 2B: Possible human carc.	International Agency for Research on Cancer

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE2,000 - 5,000 mg/kg
Meta-Andesite (composition varies naturally, typically contains feldspars, amphibole, pyroxene, chlorite and epidote)	Dermal		LD50 estimated to be 2,000 - 5,000 mg/kg
Meta-Andesite (composition varies naturally, typically contains feldspars, amphibole, pyroxene, chlorite and epidote)	Ingestion		LD50 estimated to be 2,000 - 5,000 mg/kg
Quartz (a component of Meta-Andesite)	Dermal		LD50 estimated to be > 5,000 mg/kg
Quartz (a component of Meta-Andesite)	Ingestion		LD50 estimated to be > 5,000 mg/kg
Ceramic	Dermal		LD50 estimated to be > 5,000 mg/kg
Ceramic	Ingestion		LD50 estimated to be 2,000 - 5,000 mg/kg
Titanium Dioxide	Dermal	Rabbit	LD50 > 10,000 mg/kg
Titanium Dioxide	Inhalation-Dust/Mist (4 hours)	Rat	LC50 > 6.82 mg/l
Titanium Dioxide	Ingestion	Rat	LD50 > 10,000 mg/kg
Oil	Dermal	Rabbit	LD50 > 2,000 mg/kg
Oil	Ingestion	Rat	LD50 > 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Meta-Andesite (composition varies naturally, typically contains feldspars, amphibole, pyroxene, chlorite and epidote)	Professional judgement	No significant irritation
Quartz (a component of Meta-Andesite)	Professional judgement	No significant irritation
Ceramic	Rabbit	No significant irritation
Titanium Dioxide	Rabbit	No significant irritation
Oil	Rabbit	Minimal irritation

Serious Eye Damage/Irritation

Name	Species	Value
Ceramic	Rabbit	Mild irritant
Titanium Dioxide	Rabbit	No significant irritation
Oil	Rabbit	Mild irritant

Skin Sensitization

Name	Species	Value
Titanium Dioxide	Human and animal	Not classified
Oil	Guinea pig	Not classified

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
Quartz (a component of Meta-Andesite)	In Vitro	Some positive data exist, but the data are not sufficient for classification
Quartz (a component of Meta-Andesite)	In vivo	Some positive data exist, but the data are not sufficient for classification
Ceramic	In Vitro	Some positive data exist, but the data are not sufficient for classification
Titanium Dioxide	In Vitro	Not mutagenic
Titanium Dioxide	In vivo	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
Quartz (a component of Meta-Andesite)	Inhalation	Human and animal	Carcinogenic
Ceramic	Inhalation	Multiple animal species	Some positive data exist, but the data are not sufficient for classification
Titanium Dioxide	Ingestion	Multiple animal species	Not carcinogenic
Titanium Dioxide	Inhalation	Rat	Carcinogenic
Oil	Ingestion	Rat	Not carcinogenic
Oil	Dermal	Mouse	Some positive data exist, but the data are not sufficient for classification

Reproductive Toxicity

Reproductive and/or Developmental Effects

For the component/components, either no data are currently available or the data are not sufficient for classification.

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Oil	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification		NOAEL Not available	

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Quartz (a component of Meta-Andesite)	Inhalation	silicosis	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL Not available	occupational exposure
Ceramic	Inhalation	pulmonary fibrosis	Not classified	Multiple animal species	NOAEL not available	
Ceramic	Inhalation	respiratory system	Not classified	Human	NOAEL not available	occupational exposure
Titanium Dioxide	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 0.01 mg/l	2 years
Titanium Dioxide	Inhalation	pulmonary fibrosis	Not classified	Human	NOAEL Not available	occupational exposure

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

For Transport Information, please visit <http://3M.com/Transportinfo> or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations

Contact 3M for more information.

EPCRA 311/312 Hazard Classifications:

Physical Hazards

Not applicable

Health Hazards

Carcinogenicity

Specific target organ toxicity (single or repeated exposure)

15.2. State Regulations

Contact 3M for more information.

California Proposition 65

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>Listing</u>
SILICA, CRYSTALLINE (AIRBORNE PARTICLES OF RESPIRABLE SIZE)	None	Carcinogen
Titanium Dioxide	13463-67-7	Carcinogen

15.3. Chemical Inventories

The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification

Health: 1 **Flammability:** 0 **Instability:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

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Silicosis

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INTRODUCTION

Silicosis refers to a spectrum of pulmonary diseases caused by inhalation of free crystalline silica (silicon dioxide). The written record of occupational lung disease caused by silica inhalation extends back to ancient Egypt and Greece. Despite a clear understanding of how to prevent this disease, new cases of silicosis continue to occur [1-6].

The clinical presentations, diagnostic evaluation, and treatment of silicosis will be reviewed here. The imaging of occupational lung disease and the evaluation of pulmonary disability are discussed separately. (See "[Imaging of occupational lung diseases](#)" and "[Evaluation of pulmonary disability](#)".)

DEFINITIONS

Several clinical presentations of disease have been described:

- Acute silicosis – Acute silicosis, also known as acute silicoproteinosis, develops after exposure to high concentrations of respirable crystalline silica and results in symptoms within a few weeks to a few years after the initial exposure.

- Chronic silicosis – Chronic silicosis usually has the radiographic pattern described below as simple silicosis. In a minority of those with chronic disease, nodules coalesce resulting in progressive massive fibrosis (PMF).
 - Simple silicosis – Simple silicosis is characterized radiographically by innumerable, sharply marginated, small rounded opacities composed of hyalinized, collagenous nodules, with a predilection for dorsal aspects of the upper lobes.
 - Progressive massive fibrosis – PMF, also known as complicated or conglomerate silicosis, is characterized by nodular lung lesions 1 cm or greater in diameter that have radiating strands extending out from the nodule. These nodules can contain air bronchograms and calcifications. The lesions of PMF occur predominantly in the upper lung zones of the chest radiograph.
- Accelerated silicosis – Accelerated silicosis is associated with high-level exposure to silica and develops within 10 years of initial exposure. Accelerated silicosis is differentiated from chronic disease only by its more rapid development following first exposure.

EPIDEMIOLOGY

Workers in a broad range of industries are exposed to crystalline silica ([table 1](#)) [4,7-10]. Up to 200,000 miners and 1.7 million non-mining workers in the United States have experienced significant occupational exposure to inhaled silica, and new cases of silicosis are recognized worldwide every year [11-13].

Among hard rock miners, radiographic evidence of silicosis is present in approximately one-third. The rate of positive chest radiographs correlates at least in part with the degree of dust exposure, although other factors such as race may play a role. African Americans have a two to seven times higher rate of developing silicosis compared with White workers with the same dust exposure [14].

It is estimated that there were between 3600 and 7300 cases per year of silicosis in the United States between 1987 and 1996 [15]. During that decade, nearly 3000 deaths were attributed to silicosis in the United States [16]. The overall mortality attributable to silicosis

has decreased substantially in the United States over the past 30 years, largely because of improved workplace protection [17,18]. From 1968 to 2002, silicosis was recorded as an underlying or contributing cause of death on 16,305 death certificates; of these, 15,944 (98 percent) deaths occurred in men [17]. From 1968 to 2002, the number of silicosis deaths decreased from 1157 (8.91 per million persons aged ≥ 15 years) to 148 (0.66 per million), corresponding to a 93 percent decline in the overall mortality rate. Subsequently, the Centers for Disease Control assessed deaths in the United States found an overall gradual decrease from 164 (0.74/million persons aged ≥ 15 years) in 2001 to 101 (0.39/million persons aged ≥ 15 years) in 2010 [19].

FORMS OF SILICA AND MECHANISM OF TOXICITY

Silica (silicon dioxide) is the most abundant mineral on earth. Silica exists in both crystalline and amorphous forms. Amorphous forms, including vitreous silica and diatomite (formed from skeletons of prehistoric marine organisms), are relatively nontoxic after inhalation [20]. In contrast, inhaled crystalline silica (quartz, cristobalite, and tridymite) is associated with a spectrum of pulmonary diseases.

Quartz is the most common type of crystalline silica and is a major component of rocks including granite, slate, and sandstone. Granite contains about 30 percent free silica, slate about 40 percent, and sandstone is almost pure silica [21]. Cristobalite and tridymite occur naturally in lava and are formed when quartz or amorphous silica is subjected to very high temperatures.

The toxicity of crystalline silica appears to result from the ability of crystalline silica surfaces to interact with aqueous media, to generate oxygen radicals, and to injure target pulmonary cells such as alveolar macrophages. Resultant generation of inflammatory cytokines (eg, interleukin-1 and tumor necrosis factor beta) by target cells lead to cytokine networking between inflammatory cells and resident pulmonary cells, resulting in inflammation and fibrosis [22].

"Free" crystalline silica is unbound to other minerals. "Combined" forms of silica, called silicates, are compounds in which silica is bound to other minerals. Examples of silicates used

in industry include asbestos (hydrated magnesium silicate), talc ($Mg_3Si_4O_{10}(OH)_2$), and kaolinite ($Al_2Si_2O_5(OH)_4$), a major component of kaolin (china clay) [23]. The pulmonary effects of asbestos inhalation are substantial, and are discussed separately. (See "[Asbestos-related pleuropulmonary disease](#)".)

SILICA IN THE WORK ENVIRONMENT

Any occupation that disturbs the earth's crust or involves processing or using silica-containing rock or ores has potential risk for silicosis. The history of occupational exposure to silica should include the types and duration of employment ([table 1](#)), dust levels, and use of effective respiratory protection. Determining whether the worker's occupational silica exposure is sufficient to cause silicosis can be difficult. Silicosis can occur in many industries and work settings including mining, quarrying, sandblasting, masonry, stone cutting, foundry work, and ceramics. Occupations that involve crushing or grinding of quartz-containing materials are also hazardous.

Current workplace exposure limits in the US are not fully protective of all exposed workers. (See "[Evaluation of pulmonary disability](#)", section on 'History and physical examination'.)

- **Mining and hydraulic fracturing** – Underground mining for coal or metal can cause silicosis, particularly when tunneling through rock with high silica content or when using sand as a friction material on rails [24-26]. Although dust exposure levels are generally lower in surface and strip mines, silicosis also occurs in these settings, particularly among drillers and their assistants [27,28]. Exposure to respirable silica has also been described in hydraulic fracturing for oil and gas recovery.
- **Sandblasting** – Sandblasting generates respirable aerosols of silica and is associated with an especially increased risk for silicosis [29-32]. The very high risk associated with sandblasting may be due to generation of freshly fractured silica particles, which appear to be particularly toxic [33]. High rates of silicosis have also been described in Turkish workers using silica to sandblast denim [32,34]. The United Kingdom restricted use of abrasives containing silica in 1949, and other European countries abandoned sandblasting during the 1960s. In contrast, there are no special restrictions on the use of

sand for abrasive blasting in the United States, except in the underground mine environment [35].

- **Foundry work** – Foundry workers can have significant exposure to aerosolized silica [36,37]. In foundries, metal castings are made by pouring molten metal into molds. These molds generally contain finely milled quartz sands, and exposure to respirable crystalline silica aerosols occurs both when the mold is knocked off the cast and when the cast is cleaned or polished. These aerosols often contain cristobalite, which is formed as a result of the intense heat associated with producing casts and is particularly toxic.
- **Masonry** – Production of silica flour, sand, concrete, and silica-based ceramics are also associated with an increased risk of silicosis [4,38-41].
- **Natural and artificial stone cutting** – Both natural and artificial stone (also referred to as engineered, agglomerated, or reconstituted stone) used in fabrication of countertops generate respiratory crystalline silica during cutting and grinding. The silica content in artificial stone is greater than 90 percent, potentially exposing workers to higher amounts of silica dust [42]. Exposures are often intense and lead to severe forms of silicosis [41,43,44]. Engineered stone countertops have become increasingly popular and outbreaks of silicosis in stone fabrication workers have been reported worldwide [43-47]. Eighteen additional cases of silicosis in United States stone fabrication workers evidenced the need for identification of at risk workers and implementation of workplace exposure controls [48].
- **Other settings** – The short list of high-risk industries specifically noted above is not complete, as silicosis can occur in many dusty settings, even ones where risk was not previously appreciated ([table 1](#)). As an example, nine cases of silicosis were confirmed among dental laboratory technicians in the United States between 1994 and 2000 [7]. Other occupations (eg, agriculture, highway repair) in which the soil is disturbed can lead to significant exposures to respirable silica in airborne soil [4,39,49,50]. Although occupation is the major risk factor for silicosis, rare cases have been reported of chronic silicosis after environmental exposures in regions where soil silica content is high and dust storms are common [51].

ACUTE SILICOSIS

Acute silicosis develops after exposure to high concentrations of respirable crystalline silica and results in symptoms within a few weeks to a few years after the initial exposure [3,52-57]. Acute silicosis is rare; most individuals with extremely high silica exposures initially display radiographic features identical to those of simple silicosis, which progress to progressive massive fibrosis (PMF) over a period of as few as four to five years [52,55]. The reason that some individuals develop acute silicosis while others develop accelerated silicosis after overwhelming silica exposure is not known; genetic factors may play a role [6,58,59]. (See '[Accelerated silicosis](#)' below.)

Clinical presentation — Acute silicosis is characterized by rapid onset of symptoms including dyspnea, cough, weight loss, fatigue, and sometimes pleuritic pain and fever [60]. These symptoms may precede significant radiologic findings. On physical examination, crackles are usually present.

Evaluation — When acute silicosis is suspected due to the onset of cough, dyspnea, and sometimes fever or pleuritic chest pain in a patient with high dose exposure to silica in the recent past (eg, months to a few years), the evaluation is aimed at documenting the exposure history and excluding other processes in the differential diagnosis, such as pneumonia, acute respiratory distress syndrome, heart failure, diffuse alveolar hemorrhage, eosinophilic pneumonia, lipoid pneumonia, and pulmonary alveolar proteinosis. (See '[Silica in the work environment](#)' above.)

Laboratory — There are no laboratory tests for the diagnosis of acute silicoproteinosis. However, a complete blood count and differential, brain natriuretic peptide, granulocyte macrophage-colony stimulating factor (GM-CSF) antibodies, and cultures of blood and sputum are helpful in excluding processes in the differential diagnosis.

Assessment of oxygenation is important, either with pulse oxygen saturation or arterial blood gas, to determine the severity of respiratory impairment and whether the patient will be able to tolerate diagnostic procedures.

Pulmonary function — Lung function in the setting of acute silicosis shows spirometric reduction of forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁)

[57]. While few studies report lung volume and diffusion capacity measurements, both typically are reduced [48,52].

Imaging — In acute silicosis, the chest radiograph demonstrates characteristic bilateral, diffuse ground glass opacities ([image 1](#) and [image 2](#)) [52,61,62]. The opacities may be perihilar or basilar [63]. These features may progress from a pattern of lower zone opacities to large masses of coalesced parenchymal tissue in the mid and lower zones, which are typically bilateral but not always symmetrical [52,63]. (See "[Imaging of occupational lung diseases](#)", section on 'Silicosis'.)

The high resolution computed tomography (HRCT) findings consist of numerous bilateral centrilobular nodular opacities, focal ground glass opacities, and patchy areas of consolidation [64]. In a small series that compared pulmonary alveolar proteinosis (PAP) and acute silicosis, the most common HRCT finding in PAP was “crazy paving”, while the most common finding in acute silicosis was dependent consolidation and nodular calcification [65]. (See "[Causes, clinical manifestations, and diagnosis of pulmonary alveolar proteinosis in adults](#)".)

Hilar lymph node enlargement may be apparent on HRCT, which is a typical feature of silicosis, but not of PAP [63]. In a series of 13 patients, calcified lymph nodes were noted on HRCT in 11 (85 percent) [64]. (See "[Imaging of occupational lung diseases](#)", section on '[Silicosis](#)'.)

Bronchoalveolar lavage — When acute silicosis is suspected, bronchoalveolar lavage (BAL) is used to exclude infection, eosinophilic pneumonia, and alveolar hemorrhage. In acute silicoproteinosis, BAL yields a thick, opaque (milky) effluent similar to that seen in pulmonary alveolar proteinosis. On cytologic examination, the macrophages in the BAL are foamy and the lipoproteinaceous material stains brightly positive with periodic acid-Schiff (PAS) reagent [66]. (See "[Basic principles and technique of bronchoalveolar lavage](#)".)

Histopathology — The histopathology of acute silicosis is different from that of chronic or accelerated silicosis. Silicotic nodules are rarely seen, and, if present, are usually poorly developed. As described for BAL fluid, proteinaceous material fills the alveoli and consists largely of phospholipids or surfactant (or surfactant-like material) and stains with PAS

reagent. The interstitium is thickened with inflammatory cells; a minimal amount of pulmonary fibrosis is typically present. Alveoli may be lined with prominent epithelial cells, the majority of which are hypertrophic type II pneumocytes [67]. In addition, desquamated pneumocytes, macrophages, and silica particles are found in the alveolar spaces. The histologic appearance of acute silicosis resembles that of idiopathic alveolar proteinosis ([picture 1](#)) [54]. (See "[Causes, clinical manifestations, and diagnosis of pulmonary alveolar proteinosis in adults](#)".)

Diagnosis — The diagnosis of acute silicosis is based upon the history of an acute, high dose silica exposure, imaging findings of diffuse nodular and patchy consolidative opacities, a milky, lipoproteinaceous bronchoalveolar lavage effluent, and exclusion of other potential explanations (infection, pulmonary edema, alveolar hemorrhage, eosinophilic pneumonia, primary pulmonary alveolar proteinosis). A lung biopsy is not necessary in the setting of a definite exposure history and these characteristic findings.

Once lipoproteinaceous fluid has been obtained by BAL or observed on biopsy, other causes of alveolar proteinosis or lipidosis are usually identified by history of inhalational exposure (eg, titanium, indium-tin oxide, or aluminum), testing for GM-CSF antibodies, lipid-laden macrophages in bronchoalveolar lavage fluid (suggest lipid pneumonia), stains and/or cultures obtained from bronchoscopy (eg, *Pneumocystis jirovecii* or *Nocardia*), or presence of leukemic cells in the peripheral blood. (See "[Clinical presentation and diagnosis of Pneumocystis pulmonary infection in patients with HIV](#)", section on 'Bronchoalveolar lavage' and "[Clinical manifestations and diagnosis of nocardiosis](#)" and "[Aspiration pneumonia in adults](#)", section on 'Lipoid pneumonia' and "[Causes, clinical manifestations, and diagnosis of pulmonary alveolar proteinosis in adults](#)", section on 'Diagnostic evaluation'.)

Treatment — Acute silicosis is typically progressive and no specific therapy has been identified. Thus, the main treatments for acute silicosis are complete avoidance of further exposure and supportive care. (See '[Treatment](#)' below.)

The poor prognosis has spurred attempts at experimental therapy, and benefit has been reported in isolated cases with systemic glucocorticoids and whole lung lavage, but formal evaluation of these interventions has not been performed.

- In one case report, intravenous glucocorticoid therapy followed by oral [prednisone](#) was associated with initial improvement in the chest radiograph and pulmonary function [60]. However, two years after the initial improvement, the patient developed PMF. (See '[Definitions](#)' above.)
- Whole lung lavage has been attempted, based on the similarity of acute silicosis and PAP [62,68,69]. While the procedure is well-tolerated in PAP, its clinical utility in silicoproteinosis is unclear. In one case report, whole lung lavage was administered to a patient with acute silicosis and hypoxemic respiratory failure requiring mechanical ventilation, after empiric antibiotics and systemic glucocorticoid therapy were unsuccessful [62]. Following two sessions of whole lung lavage under general anesthesia, the patient was extubated and discharged from the hospital. The technique of whole lung lavage is described separately. (See "[Treatment and prognosis of pulmonary alveolar proteinosis in adults](#)", section on '[Whole lung lavage](#)'.)

Lung transplantation is a potential option for patients with progressive respiratory failure. (See '[Treatment](#)' below.)

Prognosis — The prognosis of patients with acute silicosis is very poor [63,64]. Patients rapidly develop cyanosis, cor pulmonale, and respiratory failure. Survival after onset of symptoms is typically less than four years; mycobacterial and fungal infections may complicate the clinical course.

CHRONIC SILICOSIS

Chronic silicosis (includes simple silicosis and progressive massive fibrosis [PMF]) develops slowly, usually appearing 10 to 30 years after first exposure. It is not uncommon for the radiographic appearance of silicosis to occur many years after cessation of employment in a job associated with exposure [70]. The progressive coalescence of silicotic nodules leads to replacement of upper lobe parenchyma by the nodules and air trapping and emphysema in the lower lobes due to fibrotic retraction of the upper lobes with resultant respiratory impairment.

Clinical manifestations — The clinical presentation of chronic silicosis is variable.

Individuals with simple silicosis may be asymptomatic with the only manifestation being an abnormal chest radiograph. When symptoms are present, chronic cough and dyspnea on exertion are common and become more frequent and severe with worsening radiographic abnormalities [14,71,72]. Among workers with chronic exposure to respirable silica, approximately 35 percent will report cough and sputum production [14]. Some of these workers will have chronic bronchitis due to silica inhalation, although cigarette smoking may be contributory.

PMF is associated with more severe symptoms of cough and dyspnea than simple silicosis.

Physical examination of the chest is often unremarkable in simple silicosis, although a variety of abnormal breath sounds, including fine crackles, coarse crackles (often at end inspiration), rhonchi, and/or wheezes, have been reported to occur in approximately 25 percent of affected individuals [73].

Patients with PMF frequently have decreased breath sounds and may have inspiratory crackles. PMF is not specifically associated with digital clubbing and, if present, another etiology should be sought. Other signs of chronic respiratory failure and cor pulmonale may be present.

Evaluation — When chronic silicosis is suspected due to the onset of respiratory symptoms (eg, dyspnea, productive cough) or typical chest imaging findings, the evaluation is aimed at confirming the exposure history, assessing the degree of respiratory impairment, and excluding other causes. A careful occupational history is essential, as described above. (See ['Silica in the work environment'](#) above.)

Laboratory testing — There are no laboratory tests for the diagnosis of chronic silicosis. As mycobacterial infection is often in the differential diagnosis or may develop as a complication, testing for latent tuberculosis via skin test or interferon release assay is often obtained. In addition, sputum smear and culture for mycobacteria are obtained in the presence of fever, weight loss, hemoptysis, or complicated silicosis on radiographic imaging. (See ["Approach to diagnosis of latent tuberculosis infection \(tuberculosis screening\) in adults"](#).)

Pulmonary function — Pulmonary function tests (PFTs) are a key component in the

evaluation of respiratory symptoms and abnormal radiographic findings. Typically, spirometry before and after bronchodilator, lung volumes, diffusing capacity for carbon monoxide (DLCO), and resting pulse oxygen saturation are obtained. (See "[Approach to the patient with dyspnea](#)" and "[Overview of pulmonary function testing in adults](#)".)

Complete cardiopulmonary exercise testing may be helpful in evaluating patients with respiratory symptoms, particularly exertional dyspnea, who have a history of exposure to silica and whose resting lung function is normal. (See "[Cardiopulmonary exercise testing in cardiovascular disease](#)".)

Workers exposed to respirable crystalline silica may have normal spirometry or may develop a range of pulmonary function test abnormalities [72,74-76]. In a study of 1028 foundry workers without chest radiograph abnormalities, there was a 1.1 mL per year decline in forced expiratory volume in one second (FEV₁) for each mg per cubic meter (mg/m³) of mean silica exposure [74]. The presence of even mild radiographic findings of chronic or accelerated silicosis is associated, on average, with a greater degree of abnormality in pulmonary function. Spirometry shows a mixed picture of obstructive and restrictive ventilatory impairment with decreased FEV₁ and FEV₁/forced vital capacity (FVC) ratio [71]. (See "[Overview of pulmonary function testing in adults](#)".)

Pulmonary function, on average, worsens in association with worsening radiographic abnormalities of chronic or accelerated silicosis; cigarette smoking is often contributory [77]. PMF is associated with the worst pulmonary function abnormalities, including decreased compliance, decreased FEV₁ and FEV₁/FVC ratio, and decreased DLCO [71,78]. In a number of studies using chest CT scan to evaluate lung parenchyma in chronic or accelerated silicosis, lung function abnormalities correlated better with the emphysematous changes of silicosis than the nodular changes of silicosis [79-81].

Imaging — A chest radiograph is obtained in virtually all patients undergoing evaluation for chronic silicosis; high resolution computed tomography (HRCT) is helpful for patients with an atypical clinical presentation or atypical findings on chest radiograph. In our occupational lung disease specialty clinic, we often obtain a baseline HRCT scan in patients with radiographic findings of silicosis to document the presence and extent of nodules, emphysema, and other silica-related abnormalities that may progress in the future.

- **Chest radiograph** – The typical chest radiograph finding in chronic simple silicosis is the presence of innumerable, small, rounded opacities (less than 10 mm in diameter). The nodules are generally rounded but can be irregular, and are distributed predominantly in the upper lung zones ([image 3A-B](#)). Progressive massive fibrosis (PMF, also known as conglomerate silicosis) occurs when these small opacities gradually enlarge and coalesce to form larger, upper- or mid-zone opacities more than 10 mm in diameter ([image 4](#)) [24]. As these opacities progressively enlarge, the hila are retracted upward in association with upper lobe fibrosis and lower lobe hyperinflation. The opacities of PMF can be asymmetrical, and may mimic a neoplastic process. Cavitation may also be present in advanced disease or in the setting of mycobacterial superinfection. Hilar adenopathy with prominent calcification is present in up to 5 percent of workers with silicosis. (See "[Imaging of occupational lung diseases](#)", section on 'Silicosis'.)

Several reports have compared the accuracy of the chest radiograph appearance to pathologic examination of the lungs at autopsy in detecting silicosis. In a study of more than 500 South African gold miners, when radiographs were scored using the International Labor Office (ILO) classification system profusion classes of 1/0, 1/1, and 1/2 as cutoffs, sensitivities were found to be 50, 37, and 25 percent, respectively, and specificities 89, 96, and 100 percent, respectively [82]. A subsequent smaller study of 241 South African gold miners evaluated use of "miniradiographs" with cutoffs at ILO profusion categories 0/1, 1/0, and 1/1. Sensitivities were 89, 74, and 71 percent, respectively, and specificities were 73, 87, and 96 percent, respectively [83]. Reasons for improved sensitivity in the second study were unclear. (See "[Imaging of occupational lung diseases](#)", section on 'The International Labor Office classification' and "[Evaluation of diffuse lung disease by conventional chest radiography](#)".)

- **High resolution computed tomography** – HRCT is usually not necessary in simple silicosis unless atypical clinical or radiographic features are noted (eg, fever, spiculated nodules, a single nodule of substantially larger size than the others). However, HRCT has been shown to improve sensitivity and significantly reduce inter-reader variability compared to conventional radiography [84,85]. The typical HRCT findings in simple silicosis are bilateral, symmetric, centrilobular, and perilymphatic nodules with sharp margination ([image 5](#)). These nodules calcify in 10 to 20 percent of patients.

HRCT is superior to conventional chest radiography for documentation of conglomerate lesions and emphysematous changes associated with complicated silicosis ([image 6](#)) [78-81,86-88]. (See "[High resolution computed tomography of the lungs](#)".)

Although pleural effusions are unusual, pleural thickening appears to be common, especially among patients with more severe disease. In a series of 110 patients with biopsy proven silicosis followed for a mean of 14 years, pleural effusions were noted in 12 patients (11 percent), but pleural thickening was present in 64 patients (58 percent) [89].

- **FDG-PET scan** – Fluorine-18-fluorodeoxyglucose (18F-FDG) positron emission tomography (PET) scans are often used to help differentiate benign from malignant lung lesions. However, FDG-PET uptake can be increased in PMF in the absence of malignancy or infection [90]. While the ideal cut-off for maximum standardized uptake value (SUV_{max}) has not been agreed upon, using a threshold of 7.4, may help differentiate PMF from lung cancer in patients with pneumoconiosis. The SUV_{max} , short and long axis diameters, and Hounsfield units of lung masses on FDG-PET scans were evaluated in a series of 49 patients with pneumoconiosis and a total of 83 lung masses, 42 of which were lung cancer [91]. The sensitivity, specificity, and accuracy of FDG-PET for the diagnosis of lung cancer were 81 percent, 73 percent, and 77 percent, respectively, with an SUV cut-off of 7.4. Metastatic lymph nodes also showed a higher SUV_{max} than benign lesions. (See "[Overview of the initial evaluation, diagnosis, and staging of patients with suspected lung cancer](#)".)

Bronchoscopy — Flexible bronchoscopy has a limited diagnostic role in chronic silicosis, and, for most patients, bronchoscopy to confirm the diagnosis is not indicated. However, bronchoscopic washings, brushing, or bronchoalveolar lavage may be used to obtain samples for microbiologic studies and cytology when infection and/or malignancy are in the differential diagnosis based on the imaging results. In general, transbronchial biopsy is avoided in chronic silicosis due to the presumed risk for pneumothorax and the small tissue sample size. (See "[Role of lung biopsy in the diagnosis of interstitial lung disease](#)".)

Diagnosis — In general, the diagnosis of chronic silicosis is a clinical diagnosis; lung biopsy to obtain a histopathologic diagnosis is reserved for situations when a confident clinical

diagnosis cannot be made.

Clinical diagnosis — A clinical diagnosis of chronic silicosis is based on three key elements:

- A history of silica exposure sufficient to cause the degree of illness and the appropriate latency from the time of first exposure (see '[Silica in the work environment](#)' above)
- Chest imaging (usually a conventional chest radiograph) that shows opacities consistent with silicosis [92] (see '[Imaging](#)' above)
- Absence of another diagnosis more likely to be responsible for the observed abnormalities

When the three clinical requirements for the diagnosis of silicosis are met, additional evaluation is not necessary to make the diagnosis.

Lung biopsy — In rare instances, the diagnosis of chronic silicosis cannot be made clinically, and biopsy of the lung is necessary. The traditional view has been that a surgical lung biopsy (via video-assisted thoracoscopy or thoracotomy) is preferred due to the chance of pneumothorax after transbronchial lung biopsy. The increased risk for pneumothoraces in silicosis may be explained by the presence of stiff upper zones while emphysematous changes are present in the lower zones. The advantages and disadvantages of transbronchial and surgical approaches to lung biopsy are discussed separately. (See "[Role of lung biopsy in the diagnosis of interstitial lung disease](#)".)

Pathology — The earliest histopathologic changes identifiable in workers with chronic low-level exposure to free crystalline silica are dust-laden macrophages and loose reticulin fibers in the peribronchial, perivascular, and paraseptal or subpleural areas [22,93]. With long-term exposure, silicotic nodules, the pathologic hallmark of silicosis, develop a characteristic layered or spiral appearance. The central zone is hyalinized and composed of concentrically arranged collagen fibers. The peripheral zone is whorled and becomes less organized toward the edges. This outer zone contains macrophages, lymphocytes, and lesser amounts of loosely formed collagen and is the site of active inflammation and enlargement.

While not always present, silica particles typically are birefringent under polarized light; they

may be present intra- or extracellularly [6]. Energy dispersive X-ray analysis (EDXRA) of metal content is rarely used due to very limited availability.

Silicosis in hilar lymph nodes may precede parenchymal silicosis, and lymph node fibrosis may impair silica clearance and contribute to development of parenchymal fibrosis [94]. As the disease progresses, the periphery of the silicotic nodule moves farther from the hyalinized center, enmeshing small airways, pleura, and blood and lymphatic vessels in the fibrotic process ([picture 2](#)). Coalescence of silicotic nodules forms the PMF lesion. As these aggregates enlarge, the center of the PMF lesions may undergo ischemic necrosis and cavitate. Superimposed mycobacterial infection can also lead to cavitation.

Differential diagnosis — Diseases capable of mimicking the radiographic appearance of silicosis include infections (eg, mycobacterial or fungal disease), pulmonary malignancy (a consideration when the coalesced lesions of progressive massive fibrosis are unilateral or asymmetric), rheumatoid nodules (referred to as Caplan's Syndrome in the presence of coal workers' pneumoconiosis [95]), sarcoidosis, and pulmonary Langerhans cell histiocytosis. (See "[Approach to the adult with interstitial lung disease: Diagnostic testing](#)" and "[Imaging of occupational lung diseases](#)", section on 'Silicosis' and "[Imaging of occupational lung diseases](#)", section on 'Coal worker's pneumoconiosis' and "[Pulmonary Langerhans cell histiocytosis](#)" and "[Diagnostic evaluation of the incidental pulmonary nodule](#)".)

Treatment — There is no proven specific therapy for chronic silicosis. All patients with radiographic evidence of silicosis should avoid further exposure to respirable silica, which may include optimizing respiratory protection in the workplace or changing their occupation.

Supportive therapy includes smoking cessation (if needed), treatment of airflow limitation with bronchodilators, vaccination against influenza and pneumococcus, and use of supplemental oxygen (if indicated) to prevent complications of chronic hypoxemia. (See "[Overview of smoking cessation management in adults](#)" and "[Seasonal influenza vaccination in adults](#)" and "[Pneumococcal vaccination in adults](#)" and "[Long-term supplemental oxygen therapy](#)".)

Systemic glucocorticoid therapy has been used in an attempt to interrupt the inflammation that leads to progressive silicosis, but no large, randomized clinical trials have been

performed. We do not advise using glucocorticoids for chronic silicosis in the absence of another indication, such as a flare of chronic obstructive pulmonary disease (COPD). The evidence in favor of glucocorticoid therapy comes from an observational study, in which [prednisolone](#) was administered to 34 patients with chronic silicosis [96]. Treatment resulted in statistically (although not clinically) significant improvements in lung volumes, carbon monoxide diffusing capacity, and partial pressure of arterial oxygen.

Patients should be referred for appropriate counseling concerning benefits, such as worker's compensation, to which they may be entitled. (See "[Evaluation of pulmonary disability](#)".)

Lung transplantation — Successful lung transplantation has been reported in advanced silicosis [97-101]. In a series of 19 patients with silicosis who underwent lung transplantation, the six-month, one-year, and three-year survivals were 86, 86, and 76 percent [100]. (See "[Lung transplantation: An overview](#)" and "[Lung transplantation: General guidelines for recipient selection](#)".)

Experimental treatments — A number of experimental treatments for chronic silicosis have been proposed, including inhibition of cytokines (eg, interleukin-1, tumor necrosis factor alpha), antioxidant therapy, and intratracheal administration of bone marrow-derived mononuclear cells [22,102,103]. Parenteral administration of a polymer, polyvinyl pyridine N-oxide (PVNO), inhalation of aluminum, and administration of tetrandrine, an active component of the Chinese traditional medicine "han fang ji" have not proven useful [22,104-110]. Concerns about potential adverse consequences of such treatments have been expressed.

Prognosis — Mortality from silicosis in the United States declined from 8.91 deaths per million to 0.66 in the period from 1968 to 2002 [17]. While the number of deaths from silicosis overall has declined since 1968, the number of silicosis-associated deaths reported among persons aged 15 to 44 did not decline substantially prior to 1995 [111]. It is not known to what extent deaths among younger workers were caused by acute or accelerated forms of silicosis.

Silicosis-related deaths among workers of all ages are associated with significant premature mortality [112]. Between 1996 and 2005, 1746 deaths due to silica exposure resulted in

20,234 years of life lost from life expectancy, with an average of 11.6 years of life lost. For the same period, among 307 decedents who died before age 65, or the end of a working life, there were 3045 years of life lost to age 65, with an average of 9.9 years of life lost from a working life [113].

Exposure intensity along with specific industry and job duties are associated with prognosis. For example, among 145 former denim sandblasters with early silicosis (defined as a category 1/0 small opacity profusion on chest radiograph), follow-up four years later showed that radiographic progression had occurred in 82 percent, associated with significant decline in pulmonary function in 66 percent [114].

ACCELERATED SILICOSIS

Accelerated silicosis is associated with high-level exposure to silica and is differentiated from chronic silicosis only by its more rapid development (within 10 years) following first exposure. Patients who develop silicosis after a short time period are at increased risk for the later development of progressive massive fibrosis (PMF) and may be at greater risk of complications [26]. Outbreaks of accelerated (as well as acute and chronic) silicosis in denim sandblasters, Appalachian coal miners, and artificial stone workers have shown rapidly progressing and severe disease [46,114]. It is not known why some workers with high-level exposure develop acute silicosis and others develop accelerated silicosis.

The clinical presentation of accelerated silicosis is variable. Affected individuals may be asymptomatic with the only manifestation being an abnormal chest radiograph. Among symptomatic patients, chronic cough and dyspnea on exertion are common and become more frequent and severe with worsening radiographic abnormalities [71].

Physical examination of the chest is usually unremarkable, although a variety of abnormal breath sounds, including fine crackles, coarse crackles (often at end inspiration), rhonchi, and/or wheezes, have been reported to occur in a substantial proportion of affected individuals [73].

Accelerated silicosis has the same radiographic appearance as chronic silicosis. (See '[Imaging](#)' above.)

The approach to treatment is the same as for chronic silicosis described above and includes avoidance of silica exposure, smoking cessation, bronchodilators if airflow limitation is present on spirometry, vaccination against influenza and pneumococcus, and supplemental oxygen if needed. (See '[Treatment](#)' above.)

Systemic glucocorticoid therapy has occasionally been associated with transient improvement in symptoms, but this observation has not been examined in randomized trials.

ASSOCIATED COMPLICATIONS

Silicosis is associated with an increased risk of mycobacterial infection, chronic necrotizing aspergillosis, lung cancer, rheumatic disorders, kidney disease, chronic airflow obstruction, and chronic bronchitis [2,115].

Mycobacterial infection — Mycobacterial infection, particularly tuberculosis (TB), is a long recognized and well-established complication of silicosis and should always be suspected when a patient with silicosis develops constitutional symptoms, worsening respiratory impairment, hemoptysis, or changes in the chest radiograph [116-122]. Cavitation of a progressive massive fibrosis (PMF) lesion is a particularly concerning finding ([image 7](#)). Risk factors and specific mechanisms for mycobacterial lung infection in silica-exposed workers are not well understood, though underlying HIV infection, previous TB, cumulative years of respirable crystalline silica (RCS) exposure, and more intense exposures increase risk [123].

It is important to evaluate for active TB using microbiologic techniques (eg, smear and culture of sputum, bronchial washings), since silicosis can mask the radiographic changes of active TB. In addition, the risk of active TB in patients with silicosis and a positive purified protein derivative (PPD) is markedly increased. (See "[Diagnosis of pulmonary tuberculosis in adults](#)".)

Active TB should be treated with multiple antituberculous drugs. Some reports indicate that short course multidrug treatment of latent TB infection may not be effective in the presence of silicosis [124]. Older studies suggested that antituberculous chemotherapy should be

given for an extended period, ranging from more than a year to a lifetime [125]. However, other studies have shown successful outcomes and acceptable relapse rates with shorter treatment regimens of five and nine months [126,127]. The largest study found a lower relapse rate when the usual multidrug regimen was given for eight months instead of six [128]. (See "[Treatment of drug-susceptible pulmonary tuberculosis in HIV-uninfected adults](#)".)

It has been recommended that patients with established silicosis, or those with prolonged exposure to inhaled crystalline silica, undergo tuberculin skin testing using PPD. A PPD reaction ≥ 10 mm is considered positive in this population. Latent TB infection should be treated in accordance with established guidelines. (See "[Treatment of latent tuberculosis infection in HIV-uninfected nonpregnant adults](#)" and "[Approach to diagnosis of latent tuberculosis infection \(tuberculosis screening\) in adults](#)".)

Patients with silicosis are also at risk for nontuberculous mycobacterial infection [117,118]. (See "[Overview of nontuberculous mycobacterial infections](#)" and "[Treatment of Mycobacterium avium complex pulmonary infection in adults](#)".)

Other conditions — A number of other conditions are associated with chronic silica exposure [129].

- **Chronic necrotizing aspergillosis** – A few cases of chronic necrotizing pulmonary aspergillosis have been reported in patients with progressive massive fibrosis [130,131]. In these patients, chest computed tomography demonstrated cavitary lung lesions with mycetoma formation. (See "[Clinical manifestations and diagnosis of chronic pulmonary aspergillosis](#)" and "[Treatment of chronic pulmonary aspergillosis](#)".)
- **Lung cancer** – The International Agency for Research on Cancer (IARC) determined in 1997 that there was sufficient evidence for carcinogenicity of crystalline silica [132]. Since then, additional evidence for a relationship has accumulated [133], although the relationship may not increase linearly to the highest levels of silica exposure [134-138]. Clubbing is uncommon in silicosis, so this physical finding should prompt careful assessment for malignancy.

Early lung cancers may be missed due to a presumption of progressive silicosis or parenchymal changes of silicosis may be confused with malignancy on chest imaging

studies, making lung cancer screening interpretation challenging in cases of more advanced silicosis [139]. After careful review of lung cancer guidelines in conjunction with a discussion of risks and benefits, screening for lung cancer in silica-exposed workers should be considered on a case-by-case basis. Histopathologic confirmation should be considered in the context of a lung nodule which is increasing in size, as PET scanning can be positive in both cancer and silicotic nodules. (See '[Clinical manifestations](#)' above.)

- **Rheumatic disease** – Silicosis is associated with production of autoantibodies, such as antinuclear antibody and rheumatoid factor. In addition, occupational silica exposure is associated with systemic sclerosis [140-142] and rheumatoid arthritis [140,143,144]. Case reports of other autoimmune conditions such as Sjögren syndrome, dermatomyositis, Graves disease, autoimmune hemolytic anemia, and pemphigus vulgaris also have been reported in patients with occupational exposure to silica [145-148]. Associations with systemic lupus erythematosus, mixed connective tissue disease, and systemic vasculitis are less well established [5,129,140,149-154]. (See "[Risk factors for and possible causes of systemic sclerosis \(scleroderma\)](#)", section on '[Noninfectious environmental factors](#)'.)
- **Chronic kidney disease** – Population-based studies have shown a positive relationship between occupational silica exposure and chronic kidney disease (CKD) [135,155,156]. A dose-response trend of increasing CKD risk with increasing duration of silica exposure was observed in one large study and was particularly strong among non-White workers [152]. In contrast, later studies did not find evidence of a dose-response relationship between CKD and duration of silica exposure [157-160].
- **Airflow limitation and chronic bronchitis** – Silica exposure, even in the absence of findings on conventional chest radiograph, is associated with excessive decline in spirometric performance [74-76]. Cough and sputum production are common among workers with occupational exposure to silicosis. Smoking may potentiate the increased risks of emphysema and chronic bronchitis from silica exposure [161,162].
- **Sarcoidosis** – Silicosis and sarcoidosis have similar clinical features and, without comprehensive diagnostic evaluation and exposure history, may be mistaken for one another. The similarities are complicated by epidemiologic studies assessing possible

occupational and environmental exposure associations with sarcoidosis have suggested a link to RCS [163].

PREVENTION

Silicosis is a preventable disease. As a consequence of better industrial hygiene practices, silicosis afflicts far fewer people in the United States than in the past [19]. The 2017 Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for respirable silica is a time weighted average of 50 microg/m³ over an eight hour shift [164-167]. The standard also includes other requirements for exposure assessment, methods for controlling exposure, respiratory protection, medical surveillance, hazard communication, and record-keeping. A number of studies suggested that the previous PEL of 100 microg/m³ was not protective of workers with exposure over an entire working lifetime [24,70,168,169]. Unfortunately, noncompliance with even the current PEL levels appears common [170].

NIOSH also recommends use of half-face particulate respirators with N95 or better filters for airborne exposures to silica at concentrations of 50 microg/m³ or less [171]. Above this concentration of crystalline silica, powered respirators are recommended [165].

Although primary prevention through exposure control is the critical component of silicosis prevention, health monitoring of workers with exposure to respirable crystalline quartz using chest radiographs and spirometry may assist in the early identification of people developing disease from their exposures. Efforts at secondary prevention only work if there are effective interventions resulting in reductions of quartz exposure for affected workers and others comparably exposed. Many industrialized countries mandate health surveillance for workers at risk of developing silicosis [172]. A number of NIOSH publications are available addressing such issues as awareness of silica as a workplace hazard, environmental controls, personal protection, and medical monitoring [173-175].

SUMMARY AND RECOMMENDATIONS

- The crystalline forms of silica (eg, quartz, cristobalite, and tridymite) are associated with a spectrum of pulmonary diseases known collectively as silicosis. Workers in a broad

range of industries (eg, sandblasting, mining, masonry, foundry work, glass and ceramic manufacturing) are exposed to respirable silica (silicon dioxide) ([table 1](#)). (See '[Forms of silica and mechanism of toxicity](#)' above and '[Silica in the work environment](#)' above.)

- Three patterns of silicosis have been described.
 - Acute silicosis, also known as acute silicoproteinosis, develops after exposure to high concentrations of respirable crystalline silica and results in symptoms within a few weeks to a few years after the initial exposure. Symptoms include cough, weight loss, fatigue, and sometimes pleuritic pain. It is associated with a bilateral alveolar filling pattern, similar to that of pulmonary alveolar proteinosis. (See '[Acute silicosis](#)' above and '[Imaging](#)' above.)
 - Chronic silicosis (includes simple silicosis and progressive massive fibrosis) has multiple, upper lung zone nodules that are rounded and less than 10 mm in diameter. It typically appears 10 to 30 years after exposure. Progressive massive fibrosis refers to coalescence of the nodules of chronic silicosis in association with hilar lymphadenopathy and calcification. Presentations vary from asymptomatic radiographic findings to progressive respiratory insufficiency. (See '[Chronic silicosis](#)' above.)
 - Accelerated silicosis develops within 10 years of the initial exposure and is associated with high level exposure. The radiographic pattern is that of simple silicosis although the development of radiographic abnormalities is more rapid. Patients with accelerated silicosis are at greater risk for progressive massive fibrosis. (See '[Accelerated silicosis](#)' above.)
- The diagnosis of acute silicosis is based upon the history of an acute, high dose silica exposure, imaging findings of diffuse nodular and patchy consolidative opacities, a bronchoalveolar lavage (BAL) effluent that is milky and lipoproteinaceous, and exclusion of other potential explanations (infection, pulmonary edema, alveolar hemorrhage, eosinophilic pneumonia, primary pulmonary alveolar proteinosis). (See '[Diagnosis](#)' above.)
- The diagnosis of chronic silicosis is based on the combination of a history of sufficient

respirable silica exposure to cause the clinical findings, a compatible chest radiograph, and the absence of an alternative explanation. Lung biopsy is reserved for situations in which a confident clinical diagnosis cannot be made (eg, insufficient occupational exposure history, imaging suggestive of malignancy or infection). (See '[Diagnosis](#)' above.)

- For all forms of silicosis, further exposure to silica should be avoided or minimized, if complete avoidance isn't possible. No specific therapy has been established for any form of silicosis. Symptomatic therapy includes smoking cessation (if needed), treatment of airflow limitation with bronchodilators, vaccination against influenza and pneumococcus, and use of supplemental oxygen (if indicated) to prevent complications of chronic hypoxemia. (See '[Treatment](#)' above.)
- Whole lung lavage may be an option for patients with acute silicoproteinosis and progressive respiratory failure, based on the known benefits in pulmonary alveolar proteinosis and limited data in acute silicoproteinosis. (See '[Treatment](#)' above and "[Treatment and prognosis of pulmonary alveolar proteinosis in adults](#)", section on '[Whole lung lavage](#)'.)
- Patients with advanced silicosis and no contraindications may be candidates for lung transplantation. (See '[Lung transplantation](#)' above.)
- Conditions associated with silicosis include mycobacterial and fungal infection, airflow obstruction, chronic bronchitis, autoimmune diseases, chronic kidney disease, and lung malignancy. (See '[Other conditions](#)' above.)
- As there is no proven therapy for silicosis, efforts should be directed towards prevention through a comprehensive lung health protection program focused on exposure avoidance and use of personal protective equipment. (See '[Prevention](#)' above.)

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Topic 4321 Version 30.0

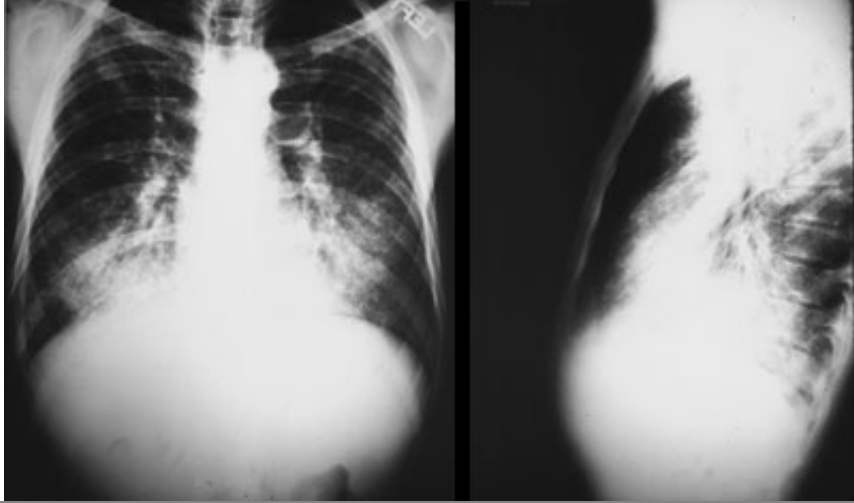
GRAPHICS

Occupations associated with silicosis

Underground coal mining
Surface coal mining
Hard rock mining
Tunneling
Hydraulic fracturing of gas and oil wells
Quarrying and stone cutting
Foundry work
Masonry
Blast furnaces
Steelworks
Rolling and finishing mills
Sandblasting, including denim sandblasting and sandblasting by dental technicians
Construction, including fabrication and installation of engineered stone countertops
Production or use of silica flour
Glass manufacturing
Cement and concrete production
Ceramics production

Graphic 55812 Version 2.0

Acute silicosis (silicoproteinosis)



There is a bilateral alveolar filling process present in both lower lung zones.

Courtesy Dr. E. L. Petsonk.

Graphic 54371 Version 4.0

Chest radiograph of silicoproteinosis

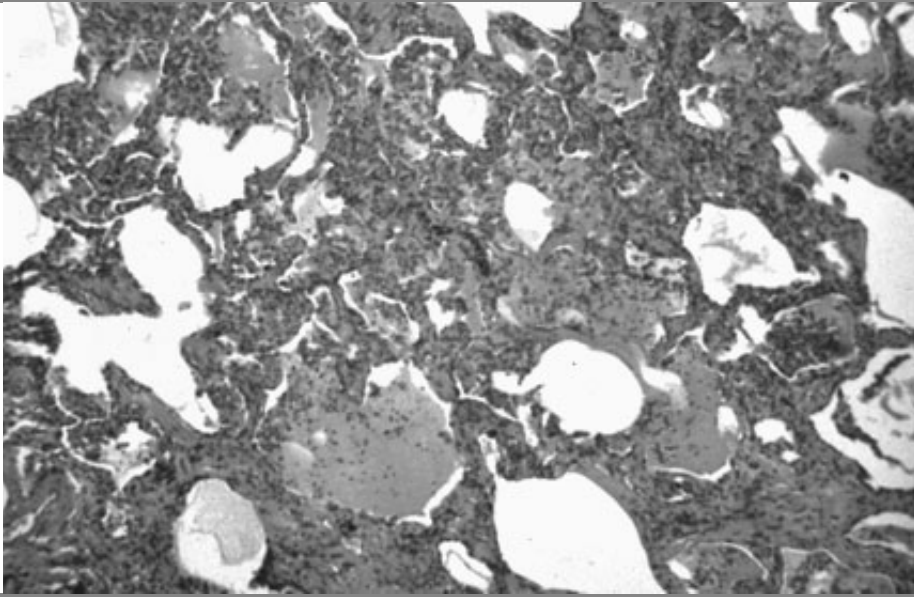


Chest radiograph from a surface coal miner shows bilateral, lower lobe confluent consolidations with air bronchograms, consistent with silicoproteinosis.

Courtesy of Daniel Banks, MD.

Graphic 91460 Version 1.0

Acute silicosis (silicoproteinosis)



There is prominent alveolar filling with eosinophilic proteinaceous material. Mild interstitial thickening is also present.

Courtesy of Dr. J Parker.

Graphic 76748 Version 3.0

Simple silicosis

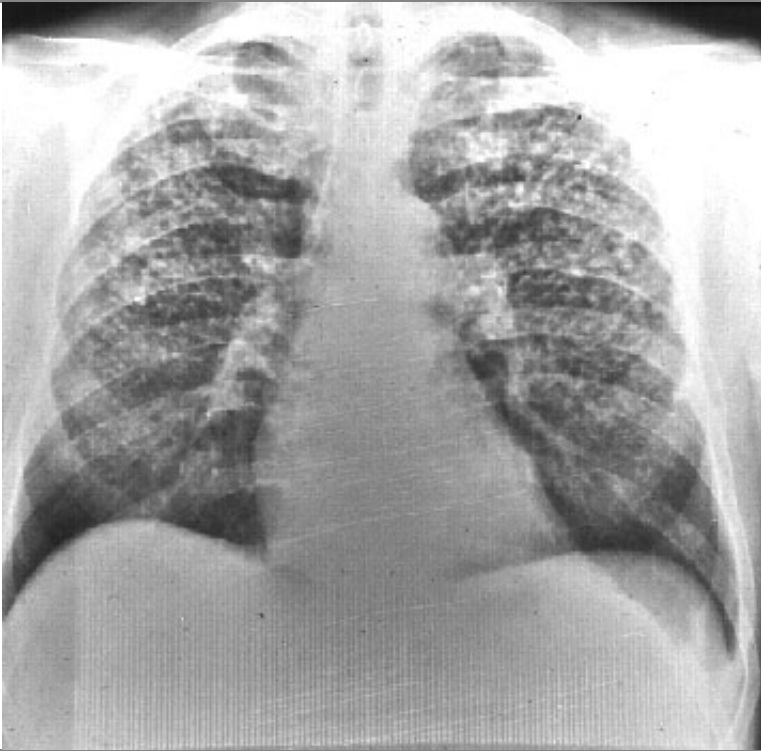


There is a profusion of small rounded densities, predominantly within the upper lung zones.

Courtesy of Dr. E. L. Petsonk.

Graphic 70007 Version 2.0

Silicosis



Chest radiograph shows multiple nodules, 3 to 5 mm in diameter, with a bias for the upper lobes. Note calcification in some of the pulmonary nodules and the hilar lymph nodes.

Courtesy of Paul Stark, MD.

Graphic 79172 Version 6.0

Progressive massive fibrosis (PMF)



Patient with end-stage silicosis complicated by respiratory failure. There is upward retraction of hila, and the lower zones are hyperinflated.

Courtesy of Dr. J. Parker.

Graphic 77392 Version 2.0

Computed tomography of simple silicosis

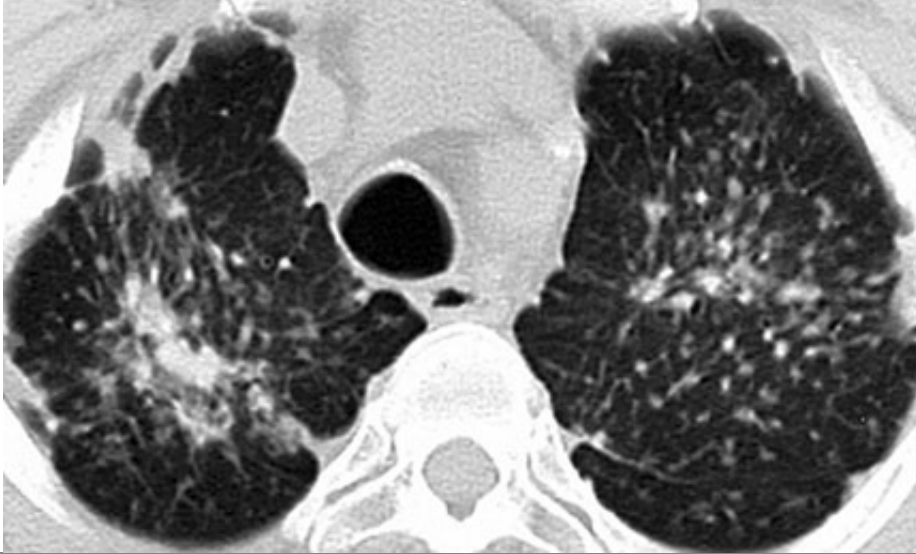


The axial computed tomography (CT) image shows sharply marginated centrilobular and perilymphatic nodules with a bias for the dorsal regions of the upper lobes.

Courtesy of HG Hieckel, MD.

Graphic 91455 Version 1.0

Chest computed tomography (CT) in early complicated silicosis

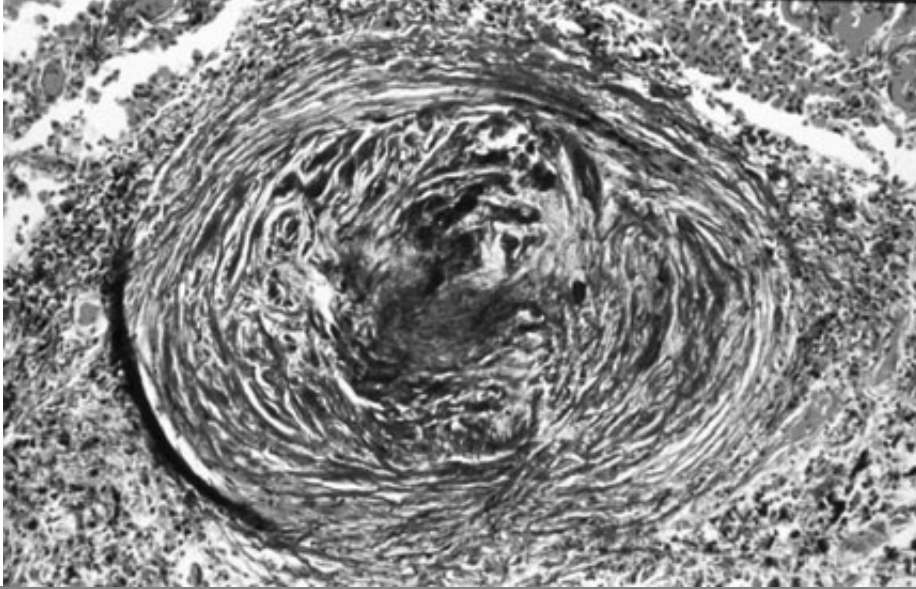


Axial computed tomogram (CT) demonstrates early development of complicated silicosis with upper lobe conglomerate shadows and early scarring with loss of volume, on a background of small rounded opacities.

Courtesy of HG Hieckel, MD.

Graphic 91456 Version 1.0

Silicotic nodule

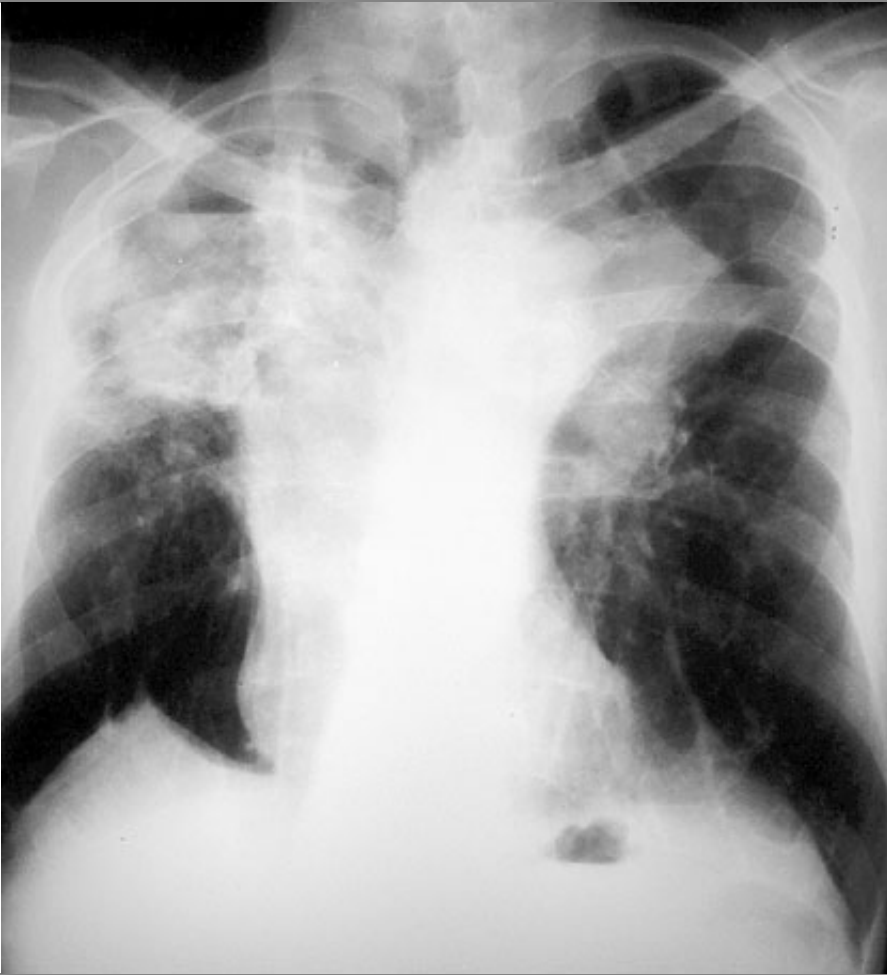


The central zone of the silicotic nodule is hyalinized with concentrically arranged collagen fibers. The peripheral zone is whorled and becomes less organized toward the edges. This outer zone contains macrophages, lymphocytes, and lesser amounts of loosely formed collagen and is the site of active enlargement and ongoing inflammation.

Courtesy of Dr. J Parker.

Graphic 58232 Version 3.0

Chest radiograph in a patient with cavitating silicotuberculosis



The chest radiograph is from a patient with silicosis complicated by tuberculosis. Bilateral upper lobe conglomerate masses are present in addition to a right upper lobe cavity with an air-liquid level.

Graphic 91459 Version 1.0

Contributor Disclosures

Cecile Rose, MD, MPH Nothing to disclose **Talmadge E King, Jr, MD** Nothing to disclose **Helen Hollingsworth, MD** Nothing to disclose

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

Conflict of interest policy

October 5, 2021

Dear Planning Commission Members,

I am Susan Port. My husband and I have Winterport Farm at 2690 State Highway 104. We are one of the closest neighbors to the SGI operations and are concerned about the proposed expansion. SGI has been allowed to operate on a 1989 use permit that does not fit the existing operation. We have definitely been impacted by the operation and are glad to see the EIR.

Some of my major concerns are discussed below:

Air quality is a major concern. Air pollution is a year round problem. We live with a constant layer of dust and also breathe it daily. Dust is easier to see than other possible pollutants in the air. Both the quantity and toxicity of the hard rock dust and emissions from the equipment need to be evaluated and addressed.

Noise is a major complaint by all the neighbors of SGI. The noise from mining, blasting, crushing, transporting, back up horns, trains, processing, and added traffic is continual. It is especially loud at night. The original permit was for 10 hour days, 5-6 days a week. The only time there was night noise disturbance was when they were providing rock for the levees during a flood year. SGI runs 24 hours a day 7 days a week. Noise mitigations along with decibel levels need to be addressed.

Water is a critical issue. Where are they getting their water and will it be adequate for their operation? Also, the run off from stock piles and the surrounding disturbed lands needs to be controlled. Downhill from the quarry is Loch Lane, grazing land, and prime farm land.

The **geology and hydrology** are also crucial to our future. The fertile lone valley was formed by the hard rock around it allowing sediment to collect in the valley. The water table is shallow. What happens if the surrounding rock is fractured? Will it drain the underground water in our valley? There is already seepage of ground water into the pit. What happens as the pit is deepened from 325 feet above sea level to 280 feet below sea level? What effect will it have on the water in the lone valley and on the recharge of water into the Cosumnes Groundwater Basin?

Aesthetics: Oak woodlands are being destroyed. Part of the beauty of our county is the oak woodlands. The original quarry and roads took out approximately 150 oaks. How many more have been or will be taken out? Should oak mitigation be required?

The request for a permit until **2175** is unreasonable. How can the consequences of the operation be known predicted and accepted for 154 years? Periodic reviews for reevaluation should be included or a much shorter time be given.

My family has been on this farm for over 100 years and in the lone valley for 154 years. We have been continuously involved in agriculture and would like to continue. We are the neighbors of the quarry. Currently our lives have been negatively impacted by the operations of SGI. Please take these concerns seriously and consider the neighbors in your decisions.

Sincerely,

Susan Port



Mine expansion

Patrice Prest <patriceprest@gmail.com>

Tue, Oct 5, 2021 at 2:37 PM

To: planning@amadorgov.org

Cc: rforster@amadorgov.org

Please do not allow the expansion of SGI mine outside of the city limits and lone. As it is now there's particulates over our cars solar panels etc. and expansion of this mine will only make things worse our air quality, visual truck traffic operating hours and ground water use. In combination with a Newman Ridge project and other industrial projects I'm on the 104 I think I own has been hit hard enough. We have so many issues here with water to the golf course contamination of water that's been alleged etc. we don't need anything more.. also asking for 125 year operating permit with no periodic environmental public health review is unconscionable. The quarry can stay there it's been there for 60 years but let's not expand no matter what's been promised to Amador County.

Sent from my iPhone



Ione Gravel Mine

Peter Scholtes <pscholtes.ps@gmail.com>
To: planning@amadorgov.org

Tue, Oct 5, 2021 at 7:07 AM

Dear Amador County Planning Commission,

Since I am unable to attend the meeting on this subject tonight, I wanted to briefly express my concerns on the matter. While we live in Castle Oaks and notice the constant high levels of dust that settles on our cars and property, the bigger picture is more troubling. If it is true that the quarry will triple in size with no periodic oversight from an environmental impact perspective, then this serves as an official strong opposition on our part. No business should operate with total impunity from the fallout it produces in regards to air pollution, water usage, road infrastructure, etc. The lack of a site restoration mandate seems ludicrous as well. While we support economic growth and welcome entrepreneurship, there has to be accountability. Please ensure the current and future safety/quality of life for the people of Ione when considering the terms/conditions of approval for this quarry expansion.

Sincerely,

Pete and Lori Scholtes



Proposed SGI Expansion

Mitchell Sorscher <msorscher@gmail.com>

Tue, Oct 5, 2021 at 9:47 AM

To: planning@amadorgov.org

To whom it may concern:

I am opposed to the proposed expansion of the SGI open-pit mine on Highway 104 for the reasons listed below:

It will triple the size of the existing mine

It requests an unrealistically long operating permit--125 years is effectively eternity

This expansion will reduce my property values, negatively affect air quality, and put additional strain on severely limited water resources.

Mitchell Sorscher
126 NorthwoodsWay
lone, CA 95640

APPENDIX A-3
INITIAL STUDY

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CEQA Environmental Checklist Form

1. **Project Title:** Ione Quarry Expansion Project
2. **Lead Agency Name and Address:** Amador County
Planning Department
810 Court Street
Jackson, CA 95642
3. **Contact Person and Phone Number:** TBD
4. **Project Location:** 1900 California Highway 104
Ione, CA 95640
Assessor's Parcel Number: 005-080-020-000
(previously 05-080-003 and -004)
5. **Project Sponsor's Name and Address:** Specialty Granules (Ione) LLC (SGI) (Applicant)
1900 California Highway 104
Ione, CA 95640
6. **General Plan Designation:** The subject property is located within a Mineral Resource Zone (MRZ) General Plan designation.
7. **Zoning:** The subject property is located within a Single Family Residential and Agriculture (R1A) zoning designation.
8. **Description of Project:**

Specialty Granules (Ione) LLC (SGI) operates Ione Quarry, an approximately 330-acre hard rock mining operation within an unincorporated area of Amador County (County), approximately three miles west of the city of Ione (see Figure 1, "Regional Location," and Figure 2, "Site Location"). SGI proposes to expand the existing footprint and depth of Ione Quarry to access additional rock reserves (see Figure 3, "Existing Conditions and Surrounding Land Uses"). This expansion requires an amended Conditional Use Permit (CUP) and an amended Reclamation Plan that allows for the expanded proposed mining area and additional stockpiling area(s) for the additional overburden and cap rock (the proposed project under the California Environmental Quality Act [CEQA]). The expansion would provide for an estimated additional 100 years of operation beyond the current use permit expiration date (2075) at the current annual production rate. The proposed project does not include an increase in the current rates of production at the quarry or any changes to operations.

The proposed project consists of expanding the quarry and stockpile areas and extending operations to 2175. Figure 4, "Mine Expansion Design," Figure 5, "Quarry Cross Sections," and Figure 6, "Stockpile Cross Sections," show the quarry and stockpile expansion design. No changes in the current rates or methods of production are proposed under the project. The final quarry and stockpile configuration and cross sections are shown in Figures 4, 5, and 6. A single 100-foot-wide ramp beginning at the south crest would spiral clockwise down the slopes to the quarry bottom. Interramp slope angles (i.e., individual highwall/benches) would be 1H:1V, and the overall quarry slope angle would range from 1H:1.3V to 1H:1.07V. The maximum slope height would be 710 feet in the central part of the southwest wall. The final quarry bottom elevation would be 280 feet below msl. The working highwall face height would be 55 feet, with a 26-foot-wide catch bench, and an approximately 1H:0.6V working face slope.

Cap rock would continue to be stockpiled next to the quarry for crushing at the adjacent plant. The quarry expansion would require additional stockpile area for storing the additional overburden soil and cap rock that would be excavated to gain access to the underlying hardrock used to create granules. The stockpile expansion design is shown in Figure 4. The stockpile area's total surface disturbance would be approximately 86 acres and have a final elevation of up to 560 feet msl. The stockpile would be set

back from the quarry a minimum of 25 feet. The proposed cap rock stockpile would include 2H:1V interbench slopes and 30-foot-wide benches every 50 vertical feet.

Mine reclamation is required by the Surface Mine and Reclamation Act (SMARA), which requires mines to be reclaimed to a usable condition that is readily adaptable for a productive alternative land use that creates no danger to public health or safety. A reclamation plan amendment has been submitted as part of the application materials in compliance with SMARA regulations. The plan provides for a site that is suitable for grazing, open water, and open space at the completion of mining (see Figure 7, "Reclamation Plan").

The proposed reclaimed end uses for the site following mining are open space, open water, and grazing. All structures would be removed. The quarry would be allowed to fill with surface and ground water to create an open water area equalizing at an elevation of approximately 105 feet mean sea level (msl). Surface disturbance surrounding the quarry, ancillary areas, and the cap rock/overburden stockpile would be graded to provide slope stability and erosion control. The quarry slopes and highwalls above the final open water surface elevation would not be revegetated. Disturbed ancillary surfaces would be vegetated with seed mix to reestablish an open space vegetation condition similar to surrounding vegetation communities and sufficient to support grazing. The caprock stockpile may be revegetated with an erosion control seed mix if sufficient overburden and topsoil are available. The success of revegetation would be monitored after completion of final reclamation to ensure successful establishment and erosion control.

Facilities and infrastructure to remain post-mining include access roads and stormwater control structures (e.g., basins, down drains, ditches). Access roads would remain to support post-reclamation land uses and allow for monitoring. In addition, stormwater facilities would remain to capture and direct stormwater flows from the stockpile to the detention basins.

9. Surrounding Land Uses and Setting:

The project site is surrounded by undeveloped open space, agriculture, industrial, low-density residential development, and commercial uses. Open space and grazing land, SGI's granules plant and solar farm, Amador Central Railroad (running north-northwest), and SR 104 are located to the north of the project site. Open space surrounds the site to the west and south (including Loch Lane Lake). Low-density residential and cattle ranch (approximately .25 and .3 mile southeast) uses, open space (including Dutschke Hill), and historic mining areas are located to the southeast and east of the project site.

10. Other public agencies whose approval is required (e.g., permits, financing, approval, or participation agreement):

- California Department of Conservation, Division of Mine Reclamation (review of revised reclamation plan and related financial assurance);
- Central Valley Regional Water Quality Control Board (Section 401 certification and/or waters of the State permit);
- California Department of Fish and Wildlife (Section 1602 Lake and Streambed Alteration Agreement and possibly a California Endangered Species Act permit);
- U.S. Fish and Wildlife Service (Section 7 consultation; incidental take statement); and
- U.S. Army Corps of Engineers (Section 404 permit).

- 11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

Tribal consultation has not occurred at the time of preparation of this initial study. The County intends to notify local tribes of the proposed project concurrent with the Notice of Preparation. Furthermore, determination of significance of impacts to tribal cultural resources will be included in the Environmental Impact Report, which will be prepared following the scoping period.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED		
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.		
<input checked="" type="checkbox"/> Aesthetics and Visual Resources	<input type="checkbox"/> Agriculture and Forestry Resources	<input type="checkbox"/> Air Quality
<input checked="" type="checkbox"/> Biological Resources	<input checked="" type="checkbox"/> Cultural Resources	<input type="checkbox"/> Energy
<input checked="" type="checkbox"/> Geology and Soils	<input type="checkbox"/> Greenhouse Gas Emissions	<input type="checkbox"/> Hazards and Hazardous Materials
<input checked="" type="checkbox"/> Hydrology and Water Quality	<input checked="" type="checkbox"/> Land Use/Planning	<input type="checkbox"/> Mineral Resources
<input checked="" type="checkbox"/> Noise	<input type="checkbox"/> Population/Housing	<input type="checkbox"/> Public Services
<input type="checkbox"/> Recreation	<input type="checkbox"/> Transportation	<input checked="" type="checkbox"/> Tribal Cultural Resources
<input type="checkbox"/> Utilities/Services Systems	<input type="checkbox"/> Wildfire	<input checked="" type="checkbox"/> Mandatory Findings of Significance

ENVIRONMENTAL DETERMINATION

On the basis of this initial evaluation:

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that, although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

 TBD
 Amador County
 Planning Department

 Date

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1. AESTHETICS				
<i>Except as provided in Public Resources Code Section 21099, would the project:</i>				
a) Have a substantial adverse effect on a scenic vista?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage points.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a-d) Scenic resources in western Amador County, where the project site is located, consist of low-lying hills covered in annual grasslands, oak woodlands, open space, and agricultural and rangeland with rural residences scattered throughout the hills. The incorporated City of Ione is approximately three miles southeast of the project site. Surrounding the project site is undeveloped open space, agriculture, historic mining areas, industrial, low-density residential development, and commercial uses.

The proposed quarry expansion would require additional stockpile area for storing the additional overburden soil and cap rock that would be excavated to gain access to the underlying rock reserve. The stockpile area would expand from 34 acres to approximately 86 acres. The height of the stockpile will increase by approximately 44 feet, for a final elevation of up to 560 feet msl (see Figures 4 and 6). The increase in size of the stockpile could impact views and the visual character of the surrounding area. Therefore, the proposed project could result in a potentially significant impact on aesthetics and visual resources. The topic will be analyzed at length in the EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2. AGRICULTURAL AND FOREST RESOURCES				
<i>Would the project:</i>				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

- a) *Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

The proposed project area does not include Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The project area has been classified by the Farmland Mapping and Monitoring Program of the State Department of California as “Other” and “Grazing,” both of which are not considered important farmland categories (DOC 2021). There would be no impact regarding conversion of important farmland.

- b) *Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?*

The site is zoned Single Family Residential and Agricultural district. Mining is a permitted use within this zone subject to approval of a use permit. The project area’s zoning designation would not change under the proposed project. In addition, mining and subsequent reclamation of the site to an open space and grazing land use does not prevent concurrent or future agricultural activities on the property. Therefore, implementation of the proposed project would not conflict with the existing zoning for an agricultural use. The project area is not subject to a Williamson Act contract; therefore, there would be no impact related to conflicts with a Williamson Act contract.

- c) *Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?*

No forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)) are located on or in the vicinity of the project area. Therefore, no conflict with zoning for forest land, timberland, or timberland production would occur. Also, no loss or conversion of forest land would occur. No impact regarding forest land zoning conflicts would occur.

- d) *Result in the loss of forest land or conversion of forest land to non-forest use?*

The project would not convert forestland to non-agricultural uses, nor will it result in the loss of any forest or timberland, since there is no timberland or timber production on the site. No impact would occur regarding conversion of forest or timberland.

- e) *Involve other changes in the existing environment, which due to their location or nature, could result in conversion of farmland, to non-agricultural use?*

No forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)) are located on or in the vicinity of the project area. Therefore, no conversion of forest land to non-forest use would occur.

The proposed project would expand an existing quarry pit and stockpile. At this time, the property is not used for agricultural activities, but the site is zoned R1A for residential and agricultural use. However, the additional 80 acres to be impacted is marginal, dryland grazing land. This impact is considered less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
3. AIR QUALITY				
<i>Would the project:</i>				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

- a) *Would the project conflict with or obstruct implementation of the applicable air quality plan?*

The proposed project would not increase extraction, processing, or hauling rates or result in any change to off-site product distribution. Furthermore, the project site would be reclaimed to end uses of open space, grazing, and open water, which would involve substantially less emissions than under the mining phase. In other words, long-term and stationary air emissions under the proposed project would remain the same as existing levels and diminish once mining is complete. Thus, the project would not cause any emissions in excess of the existing CEQA baseline.

The proposed project site is located within the Mountain Counties Air Basin (MCAB) and is under the jurisdiction of the Amador Air District (AAD). AAD’s primary responsibility is attaining and maintaining National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). AAD is responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, and monitoring ambient air quality and meteorological conditions. An air basin is in attainment (i.e., compliance) when the levels of the pollutant in that air basin are below NAAQS and CAAQS thresholds. The project site is located in an area that is currently in federal and state non-attainment for 8-hour ozone (EPA 2020; AAD 2018).

Mining and associated operational activities generally have the potential to adversely affect air quality. However, the Ione Quarry is an existing, permitted mine that currently incorporates measures to reduce pollutant emissions generated by mining, stockpiling, processing, and reclamation activity, as stipulated by the current use permit and Conditions of Approval (COAs). Applicable COAs include COAs 12, 18, 19, 20, and 21, which require the operator to obtain permits and approvals from AAD and implement dust control measures. These measures and conditions would continue to apply to the proposed project upon approval. The application of these measures results in existing and proposed operations supporting the implementation of the applicable air quality plan. The measures and conditions are provided below (Amador County Planning Commission 1989).

- COA 12: Storage of petroleum (e.g., diesel and asphalt products shall meet the requirements of the [Air Pollution Control District (APCD, now AAD)] and Health Department. Spill or other accident catch basins shall be constructed around storage tanks that re capable of preventing any liquid material from entering any drainage channel or subsurface groundwater aquifers.
- COA 18: Prior to commencing construction, the Permittee shall obtain from the APCD an “Authority to Construct” for each point source. Prior to operation the Permittee shall obtain a “permit to Operate” from the APCD.
- COA 19: Wet suppression shall be used to reduce to the extent feasible air pollution resulting from the crushing/screening operation. Said wet suppression shall commence at the point the ore enters the primary crusher and continue at each phase thereafter. Wet suppression shall be used to control to the extent feasible dust created by quarrying activity. The installation of the apparatus to be used for said dust control, and the operation thereof, shall meet the requirements of the APCD and all other applicable federal, state, and local requirements.
- COA 20: Storage piles of quarry rock, sand, gravel, and/or banked overburden shall be stabilized with water spray, crusting agents, revegetation, or other method as approved by the APCD. Dust from haul truck movement and interior roads shall be controlled to the extent feasible through surface wetting, surface stabilization by chemical means, sealants, or paving, together with regular maintenance and cleaning, or as may be required by the conditions hereof and otherwise approved by the APCD.
- COA 21: Power supplies for the project shall be obtained from the Pacific Gas and Electric Company unless another source of power is reviewed and approved by APCD.

Since 1989, the California Air Resources Board (CARB) has adopted several Airborne Toxic Control Measures and other regulations to control emissions from on- and off-road vehicles, with which the operator must have complied and continue to comply. Implementation of additional measures to reduce emissions from mobile equipment and vehicle trips is anticipated as California strives to meet national and state greenhouse gas reduction goals (see Section 8, “Greenhouse Gas Emissions,” below). In addition to mandatory fleet improvements, the operator has demonstrated environmental stewardship by constructing a 3,000-kilowatt solar array on the project site (see Figure 3). The application of these measures also results in existing and proposed project operations supporting the implementation of the applicable air quality plan.

In addition, as cited above, federal and state required fleet upgrades (e.g., use of Tier 4 engines) and incorporation of onsite generated solar power would reduce existing operational emissions below existing levels. The proposed project would also not induce unplanned growth, remove obstacles to growth, or increase long-term traffic levels. Therefore, the proposed project would not

contribute to the non-attainment status of ozone in the County and would not conflict with the region's air quality management plans. The impact would be less than significant.

- b) *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?*

As described in question (a), above, the proposed project does not include an increase in production rate or change in operations. Therefore, no net increase in criteria pollutant emissions would occur under the proposed project. The proposed project would also not induce unplanned growth, remove obstacles to growth, or increase long-term traffic levels. Therefore, the proposed project would not contribute to the non-attainment status of ozone in the County and would not conflict with the region's air quality management plans. No cumulatively considerable increase would occur because no daily nor annual net increase in emissions would occur under the proposed project and no other projects are located within 2 miles of the project site. The impact would be less than significant.

- c) *Would the project expose sensitive receptors to substantial pollutant concentrations?*

Sensitive receptors include those who may be significantly affected by poor air quality, including children, those with respiratory illnesses, and the elderly. Land uses indicative of the presence of sensitive receptors include schools, hospitals, and convalescent homes. The project site is surrounded by undeveloped open space, agriculture, industrial, low-density residential development, and commercial uses. The nearest sensitive receptors are a low-density residence and a cattle ranch 0.25 and 0.3 miles southeast of the project site entrance. Preliminary reviews of Amador County's Geographic Information Systems database and Google Earth do not reveal the presence of sensitive land uses within one mile of the project site (Amador County 2021a; Google 2021).

The only toxic air contaminants (TAC) emitted from the project would be diesel particulate matter (DPM). Mobile equipment associated with mining and processed material transport would result in emissions of DPM during operational hours from the exhaust of off-road, heavy-duty diesel equipment. Heavy-duty diesel equipment has occurred onsite for over 25 years. Mobile equipment movement is concentrated in the central portion of the site with haul trucks transporting material offsite using an existing haul road to the northeast. These activities are approximately 3,500 feet from the closest receptor. The proposed project would not increase mobile equipment usage or allow usage closer to surrounding receivers. The proposed project would not result in additional exposure of pollutant concentration to sensitive receptors as no new or greater intensity pollutant-generating activities are proposed. The impact would be less than significant.

- d) *Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

Vehicular emissions are the only objectionable odors that may be created by project activities; however, emissions would be the same as existing conditions because the proposed project would not increase the number or frequency of vehicles used on site. Furthermore, given the low-density nature of the area and the distance between neighboring residences and proposed mining and reclamation activities, the impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
4. BIOLOGICAL RESOURCES				
<i>Would the project:</i>				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a-f) The Applicant has submitted a Biological Resources Assessment (BRA) and Delineation of Waters of the United States and State of California, both prepared by WRA, Inc., to evaluate impacts to biological resources under the proposed project. The BRA identified several protected biological resources on the project site that could be affected by implementation of the proposed project. Furthermore, the Delineation of Waters of the United States and State of California identified waters and wetlands on the project site that could be affected by implementation of the proposed project. Therefore, the proposed project could result in potentially significant impacts to a variety of protected plant (including oak trees) and animal species, their habitats, and jurisdictional waters and wetlands. Therefore, this topic will be analyzed at length in the EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES				
<i>Would the project:</i>				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Disturb any human remains, including those interred outside of formal cemeteries?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a-c) The project is required to comply with the *Amador County General Plan* and state and federal regulations pertaining to archaeological resources. These regulations include the following statutes: California Health and Safety Code Section 7050.5, California Public Resources Code (PRC) Section 5097.98 and Section 21080.3.1, California Assembly Bill (AB) 52, and California Code of Regulations (CCR) Section 15064.5[d and e]. The Applicant has submitted a cultural resources evaluation, prepared by Golder Associates, to evaluate impacts to cultural resources that could occur as a result of the proposed project. Golder identified cultural resources on the project site that could be affected by new ground disturbance associated with the proposed quarry and stockpile expansions (Golder 2020). Therefore, the proposed project could result in potentially significant impacts to cultural resources. The identified cultural resources and potential impacts will be analyzed at length in the EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
6. ENERGY				
<i>Would the project:</i>				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a) *Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

The project includes mining deeper in an existing quarry pit, expanding an existing stockpile to accommodate the additional mining, and reclaiming the existing mining operation to open space, grazing, and open water land uses. As discussed above, the proposed project does not include an increase in annual production or other operational parameters that would increase the consumption of energy resources. In addition, the applicant has already taken steps to maximize use of renewable energy by installing a new 3,000 kilowatt solar array to serve the project site, which would increase energy efficiency at the project site compared to existing conditions.

The project is also designed to use materials available on-site whenever possible, which would reduce the haul trips necessary, which in turn would reduce the amount of fuel the project requires. Materials stored on-site are also located to minimize the distance they must be moved to be placed in their final location, which conserves fuel use. Additionally, increasingly stringent federal and state regulations on engine efficiency combined with federal, state, and local regulations limiting engine idling times would further reduce the amount of transportation fuel demand.

The end uses of the project site would be open space, grazing, and open water, which would not require energy use. Considering reductions in transportation fuel use and electricity use, the proposed project would not result in the wasteful and inefficient use of energy resources during mining, construction, or post-reclamation use. Therefore, the project would have a less than significant impact regarding wasteful use of energy resources.

b) *Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

The State of California has taken steps to increase the efficiency of vehicles and other construction equipment to provide more renewable energy. Legislation is routinely passed and codified to address climate change and clean energy production. The applicable local energy plan is the *Amador Energy Action Plan*, the goal of which is to reduce electrical energy used in 2020 by 14 percent (from baseline year 2005), natural gas use by seven percent, and propane use by seven percent (Sierra Business Council et. al. 2015). The *Amador Energy Action Plan* has yet to be updated for future years, however. Based on the fact that no new buildings or structures requiring energy use are proposed and that mobile equipment are required to meet energy efficiency standards, there is no part of the proposed project that suggests it will impede any State or Local initiatives that aimed at increasing renewable energy or efficiency. Furthermore, SGI has already incorporated a new 3,000 kilowatt solar array to serve the project site, which would increase energy efficiency at the project site compared to existing conditions. Therefore, the impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
7. GEOLOGY AND SOILS				
<i>Would the project:</i>				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a-f) The proposed project involves an expansion to an existing quarry operation that would mine to 280 feet below msl (i.e., deepen the pit by an additional 605 feet). Interramp quarry slope angles (i.e., individual highwall/benches) would be 1H:1V, and the overall quarry slope angle would range from 1H:1.3V to 1H:1.07V. The maximum slope height would be 710 feet in the central part of the southwest wall. The final quarry bottom elevation would be 280 feet below msl. The working highwall face height would be 55 feet, with a 26-foot-wide catch bench, and an approximately 1H:0.6V working face slope. The project also proposes to expand an existing on-site stockpile from 34 acres to approximately 86 acres. The height of the stockpile will increase by approximately 44 feet, for a final elevation of up to 560 feet msl. The proposed cap rock and overburden stockpile would include 2H:1V interbench slopes and 30-foot-wide benches every 50 vertical feet. Given the ground-moving, excavation, and terrain-altering activities associated with proposed project, the proposed project could result in a potentially significant impact regarding soil conditions, slope or surface instability, erosion, seismic hazards, and paleontological or geological resources at the project site. Therefore, the topic will be analyzed at length in the EIR.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
8. GREENHOUSE GAS EMISSIONS				
<i>Would the project:</i>				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

a) *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

As described above in Section 3, “Air Quality,” the proposed project does not include an increase in production rate or change in operations or related emissions. The proposed project would also not induce unplanned growth, remove obstacles to growth, or increase long-term traffic levels. Once mining is complete, the end land use would be open space, grazing, and open water, which would result in fewer GHG emissions than those under existing conditions.

The Environmental Protection Agency and National Highway and Traffic Safety Administration heavy-duty vehicle GHG emissions standards, as adopted by CARB, would ensure that as the proposed project’s heavy-duty vehicles are turned over (i.e., as old model year trucks are retired and replaced with new model year trucks), future GHG emissions from these heavy-duty vehicles would decline in future years, consistent with the State’s goal of reducing future year GHG emissions to meet the year 2030 target and beyond. In addition, transportation fuels used by the proposed project’s vehicles and equipment would be in conformance with the Low Carbon Fuel Standard, which requires a 10 percent or greater reduction in average fuel carbon intensity from 2009 numbers, as fuel suppliers would be required to provide fuels meeting the applicable low carbon standard. Furthermore, the proposed project would primarily rely on these mobile sources of energy and not electricity. Even when the proposed project does rely on non-mobile sources of energy, most power would be supplied by the on-site solar farm. Therefore, the proposed project would not generate GHG emissions that could have a significant impact on the environment as there are no emissions in excess of the existing CEQA baseline. The impact would be less than significant.

b) *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Amador County does not have an adopted Climate Action Plan. The County published the *Amador County Community-Wide and Municipal Operations 2010 Gas Emissions Inventory*. However, this inventory does not identify measures or actions to reduce GHG emissions because it is intended to guide the development of a Climate Action Plan (Amador County 2016a). Therefore, the proposed project would not conflict with any applicable plans, policies, and regulations for reducing emissions of GHGs. The impact would be less than significant.

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
9. HAZARDS AND HAZARDOUS MATERIALS				
<i>Would the project:</i>				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Environmental Issues	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SUMMARY:

- a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

The proposed project would not involve any change in operations, use, or routine transport on and off the project site of hazardous materials. Once mining is complete, the site would be reclaimed to accommodate open space, grazing, and open water. Therefore, routine transport of hazardous materials to sustain the use or property would not be required once reclamation is complete. Therefore, the project would not involve risks associated with transport of hazardous materials within the area. The impact would be less than significant.

- b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

Petroleum-based fuels and oils are used on-site for fueling and maintaining the project trucks and heavy equipment. On-site storage of fuels is already contained onsite consistent with applicable County and regulatory requirements to ensure that both groundwater and surface water are adequately protected. Mobile service trucks conduct on-site maintenance operations; major repair and equipment rebuilds occur off-site. Petroleum products are disposed of off-site in a state-licensed facility. The proposed project involves an extension of existing permitted mining activity, but no changes in operation or rate of production are proposed. No undue risk, as limited by the building and fire codes, would be introduced to the project as no new buildings are proposed. In sum, although industrial uses that involve hazardous material are present on site, this is considered an existing condition and implementation of the proposed project is not anticipated to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. This impact would be less than significant.