APPENDIX A

Notice of Preparation and Scoping Report

NOTICE OF PREPARATION AND NOTICE OF PUBLIC SCOPING MEETING FOR THE SAN ANSELMO FLOOD RISK REDUCTION PROJECT ENVIRONMENTAL IMPACT REPORT

The Marin County Flood Control and Water Conservation District (Flood Control District) will be preparing an Environmental Impact Report (EIR) for the San Anselmo Flood Risk Reduction Project (Project). The Project involves implementing various flood risk reduction measures in Fairfax and San Anselmo to achieve a 25 year level of flood protection, located in central eastern Marin County.

The Project proposes several flood reduction elements (elements) designed to reduce flood risk in the watershed. Proposed elements include:

- Increasing creek and floodplain capacity to convey floodwaters.
- Removing or modifying buildings to convey floodwaters
- Enlarging some channels through the removal or modification of existing obstructions to flow.
- Reducing peak discharge and attenuating flows by increasing floodplain detention storage

This Project is part of the overall Ross Valley Watershed and Flood Risk Reduction Program that includes approximately 180 potential elements to increase the capacity of Corte Madera Creek and its tributaries as well as up to five or more detention basins located throughout the watershed. When implemented in concert, these elements provide flood risk reduction on a watershed-wide scale.

Project construction is estimated to occur over portions of two years in 2019 and 2020. In addition to certification of this EIR, regulatory permits from State and Federal agencies are required to construct these projects. Additional details about the Project are provided online at http://www.marinwatersheds.org/rossvalleywatershed-org/.

The Flood Control District is the lead agency, pursuant to the State Guidelines for the California Environmental Quality Act (State CEQA Guidelines Section 15050) for the preparation of an EIR. This EIR is being prepared by the Flood Control District in accordance with CEQA, the State of California CEQA Guidelines, and County Environmental Impact Review Guidelines. This EIR is being prepared as a project-level EIR, pursuant to the State Guidelines for the California Environmental Quality Act (State CEQA Guidelines Section 15161). This EIR will evaluate the following topical issues, but will focus on some issues more than others:

1) Aesthetics and Visual Resources	6) Geology, Soils, and Seismicity	11) Population and Housing
2) Air Quality and Greenhouse Gas Emissions	7) Hazards and Hazardous Materials	12) Public Services and Utilities
3) Biological Resources	8) Hydrology and Water Quality/Climate Change	13) Parks and Recreation
4) Cultural Resources	9) Land Use and Planning	14) Transportation, Circulation and Parking
5) Energy, Mineral, Forest and Agricultural Resources	10) Noise	

To ensure that the EIR for this San Anselmo Flood Risk Reduction Project is thorough and adequate, and meets the needs of all agencies reviewing it, we are soliciting comments on specific issues to be included in the environmental review. Public comments on the scope of issues to be evaluated in the EIR are encouraged. Details of the proposed Project elements are available on the Program website: http://www.marinwatersheds.org/rossvalleywatershed-org/.

To maximize public involvement a public scoping session meeting is planned for **Thursday, April 20, 2017 from 7:00 p.m. to 9:00 p.m. at the San Anselmo Town Hall, 525 San Anselmo Avenue, San Anselmo, CA 94960.** A presentation on the Project will begin at 7:10pm. Informational stations about the Project will be available for review and input before the meeting at 6:30 p.m. and after the meeting until 9:00 p.m. Public agencies, community groups and interested members of the public are invited to attend this meeting and present oral or written comment on the proposed Project. Hard copies of the scoping session materials will not be distributed in advance of the meeting; however can be found on the Ross Valley Watershed Program website, http://www.marinwatersheds.org/rossvalleywatershed-org/, and will be available in hard copy at the scoping session. You may also subscribe to the Program website and receive notices about future meetings and new information posted to the site.

If you wish to comment during the Notice of Preparation (NOP) comment period, or if you cannot attend the scoping meeting, we will accept written comments about the scope of the environmental report until the close of the NOP comment period at **4:00 p.m. on May 8, 2017**. Commenters are advised to mail written comments (postmarked on or before May 4) to the attention of Rachel Reid, Environmental Planning Manager at 3501 Civic Center Drive, Suite 308, San Rafael, CA 94903. Comments can also be submitted via email to

EnvPlanning@marincounty.org before the end of the comment period deadline. Please direct questions about the Project description to Liz Lewis, Planning Manager in the Department of Public Works at (415) 473-7226 or lizlewis@marincounty.org.

Rachel Reid,
Environmental Planning Manager

The San Anselmo Town Hall is accessible to persons with disabilities. If you require American Sign Language interpreters, assistive listening devices, or if you require this document in an alternate format (example: Braille, Large Print, Audiotape, CD-ROM), or if you require other accommodations to participate in this meeting, you may request them by calling (415) 473-2255 (voice/TTY) or 711 for the California Relay Service or e-mailing disabilityaccess@marincounty.org at least **four working days** in advance of the event.

Responses to NOP and Disposition of NOP Responses

This appendix contains written responses to letters received by the Marin County Flood Control & Water Conservation District (Flood Control District) in response to the NOP, submitted by interested individuals and organizations related to the San Anselmo Flood Risk Reduction Project Environmental Impact Report (EIR). Also included are responses to comments received during the scoping meeting held April 20, 2017, at San Anselmo Town Hall. The scoping period closed on May 8, 2017. Seven written comments were received and four speakers provided comments during the scoping meeting. **Table A-1** includes a summary of the comments received by Flood Control District for the EIR in response to the NOP. Responses to the comments are provided in the table.

The comment letters received on the NOP follow Table A-1.

TABLE A-1
SUMMARY OF PUBLIC COMMENTS RECEIVED IN RESPONSE TO THE NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
April 20, 2017	Sally Goldman	• The aesthetic value of a restored creek in the downtown San Anselmo area would be a benefit to the community and the EIR should discuss that	• Section 4.2, Aesthetics and Visual Resources
April 20, 2017	Brian Hennessy	• Effects of detention basin use on local groundwater hydrology, ground settlement, and liquefaction	• Section 4.7, Geology, Seismicity, Soils, and Paleontological Resources • Section 4.9, Hydrology and Water Quality
April 20, 2017	Lise Stampfu Jorme	• Cumulative effects of upstream flood reductions on downstream communities and ecosystems should be described and evaluated	• Chapter 5, Growth-Inducing and Cumulative Effects
		• Evaluate the long-term impact of sea level rise on project effectiveness	• Section 4.9, Hydrology and Water Quality
April 20, 2017	Richard Lee	• Witnessed creek levels at various location in downtown San Anselmo, Ross, and College of Marin during winter 2016/2017 flood events	• Chapter 3, Project Description
		• Recalls activities during the flood event on the evening of 1/10/17 including the flood siren sounding, peak creek levels, flooding in downtown areas, and road closures on Sir Francis Drake Boulevard	• Section 4.9, Hydrology and Water Quality
		• Concludes that the capacity of the creek in the College of Marin/Ross areas is similar to that of downtown San Anselmo, and that most of the improvements under consideration will not prevent flooding	• Section 4.9, Hydrology and Water Quality
April 20, 2017	Carol Page	• CEQA process should include improved provision of information to the public	• Chapter 1, Introduction (CEQA process) • Chapter 3, Project Description
		• The project could increase flood risks to downstream areas	• Section 4.9, Hydrology and Water Quality
April 20, 2017	Anne Petersen	• Include description and analysis of the sequencing of different implemented flood protection actions on downstream communities	• Chapter 3, Project Description • Section 4.9, Hydrology and Water Quality
		• Include noise analysis of any pumps or other infrastructure designed to help manage flooding	• Section 4.11, Noise
April 26, 2017	Suzuki Cady + 76 other area residents	• Detention basins are unpopular to the residents, who voted down a flood basin project in San Anselmo in 2015 and have spoken out against their use and location at several flood advisory board meetings	• Chapter 3, Project Description
		• Detention basins are hazardous due to stormwater surging in and out at high velocity, and stormwater debris containing hazardous materials	• Section 4.9, Hydrology and Water Quality

TABLE A-1 (CONTINUED)
SUMMARY OF PUBLIC COMMENTS RECEIVED IN RESPONSE TO THE NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
April 26, 2017 (cont.)	Suzuki Cady + 76 other area residents (cont.)	• Examples of deaths due to flash floods and drowning in detention basins	• Section 4.9, Hydrology and Water Quality
		• Detention basins can fail and flood nearby residents	• Section 4.9, Hydrology and Water Quality
		• Detention basins are susceptible to clogged drains from trash, debris, and stormwater detritus	• Section 4.9, Hydrology and Water Quality
		• Detention basins require dams and spillways, which may fail over time	• Section 4.9, Hydrology and Water Quality
		• Detention basins are expensive to build and maintain, who will pay for their future maintenance?	• Chapter 3, Project Description
		• Earthquake damage to the detention basin is likely	• Section 4.7, Geology, Seismicity, Soils, and Paleontological Resources
		• Want to know who will be liable for a levee or spillway breach impacting those who live downstream	• The EIR evaluates direct, indirect, and cumulative physical effects of the project on the environment; Liability related to possible project failure is not subject to analysis under CEQA.
		• Detention basins don't work for Ross Valley due to being unpopular, hazardous, expensive, and should therefore be removed from the flood control plan	• Chapter 3, Project Description
		• Examples of what can be done instead of a detention basin	• Chapter 6, Alternatives
April 28, 2017	Sharaya Souza	• CEQA was amended in 2014 with Assembly Bill 52 (AB 52) to create a separate category of cultural resources, "tribal cultural resources", and public agencies shall, when feasible, avoid damaging effects to any tribal cultural resources • AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015 • The Native American Heritage Commission (NAHC) recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area as early as possible • This comment letter summarizes AB 52 and the additional requirements it has added to CEQA including, but not limited to, a fourteen-day period to provide Notice of Completion of an Application/Decision to undertake a project, mandatory topics of consultation if requested by a tribe, confidentially of information submitted by a tribe during the environmental review process, and recommended mitigation measures.	• Section 4.6, Cultural Resources

Table A-1 (continued)
Summary of Public Comments Received in Response to the NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
April 28, 2017 (cont.)1	Sharaya Souza (cont.)	• Senate Bill 18 (SB 18) applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. • Some of SB 18's provisions include tribal consultation, no statutory time limit of SB 18 tribal consultation, confidentially, and conclusion of SB 18 tribal consultation. • Neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18 • Several actions for adequately assessing the existence and significance of tribal cultural resources and planning for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources are recommended by the NAHC	
April 30, 2017	Kathleen Gundry and Bill Maly	• Project design/components seem to be focused on (1) retention basins to keep a percentage of the water from flowing through the creek during storm events, and (2) flood walls and channel changes to speed up creek flow	• Chapter 3, Project Description • Chapter 6, Alternatives
		• Suggest that the county considers broadening the scope of the project or including a program of distributed Best Management Practices in residential and commercial designs	• Chapter 3, Project Description • Chapter 6, Alternatives
		• Concerned about project objectives being to alleviate flooding, and suggest they should include water quality and habitat objectives	• Chapter 3, Project Description
		• Ensure that the San Anselmo flooding project does not worsen the situation for neighbors downstream	• Section 4.9, Hydrology and Water Quality
		• Planning for improvement of stormwater management in the watershed seems imperative for long term impacts from sea-level rise on Marin communities	• Section 4.9, Hydrology and Water Quality
		• Take a more expansive, environmentally responsible approach than solutions associated with the Army Corps of Engineers	• Chapter 3, Project Description
May 8, 2017	Jean Jung	• Opposes the suggested removal of 634-636 San Anselmo Avenue	• Chapter 6, Alternatives
		• Suggests various ideas to help water flow through the area including dredging the creek and removing the weir	• Chapter 6, Alternatives

TABLE A-1 (CONTINUED)
SUMMARY OF PUBLIC COMMENTS RECEIVED IN RESPONSE TO THE NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
May 8, 2017 (cont.)	Jean Jung (cont.)	• Voices concern about the impacts of demolishing buildings on San Anselmo Avenue on loss of business and revenue, and does not think it is the most economical solution[1]	• This comment addresses the merits of the project and not the scope or content of the EIR, which is required under CEQA to address potential physical impacts of the proposed project.
May 8, 2017	Garril Page	• Beneficial and adverse effects on all stakeholders should be thorough as review of environmental effects[2]	• The EIR evaluates direct, indirect, and cumulative physical effects of the project on the environment. Other effects are not subject to analysis under CEQA.
		• The EIR should include the potential of this project, even in concept stage, as a deterrent to good community relations which then translate into quantifiable impacts on Aesthetics and Visual resources.	• Section 4.2 Aesthetics and Visual Resources
		• Adversarial attitudes over a structure that is perceived to be responsible for flooding can cause great harm even without a project: less business, empty storefronts, and unpleasant associations do not add to San Anselmo's "ambiance". Where future vacancies and loss of current amenities result from Project, these diminish the community as well as individuals.	• This comment addresses the merits of the proposed project and not the scope of the EIR. • The EIR focuses on physical environmental effects rather than social and economic effects
		• Changes in community relations associated with the project could affect Land Use, Population and Housing	• Section 4.10, Land Use Planning • Section 4.12, Population and Housing
		• Nursery Basin positive and negative topographic changes should be documented	• Chapter 3, Project Description
		• Aesthetic and visual effects analyses of floodwalls and structural changes should include all direct and indirect effects, including effects from root cutting	• Section 4.2, Aesthetics and Visual Resources
		• To the degree relationships and social behaviors in downtown San Anselmo, the Nursery Basin community, and the Winship Bridge neighborhood become divisive, fragmented by the Project and influences of the flawed Project process, these are identifiable as cultural losses. There have been Project and Program presentations which cause confusion and dissension instead of enabling real progress toward a shared goal. Factual errors about the Project/Program are acknowledged in public meetings, yet left uncorrected. Meeting protocols have stifled public participation, creating frustration.	• The EIR evaluates direct, indirect, and cumulative physical effects of the project on the environment. Other effects are not subject to analysis under CEQA. • Chapter 1, Introduction (CEQA process)

[1] Consistent with CEQA, economic or social effects of a project are not to be treated as significant effects on the environment (CEQA Guidelines Section 15131).
[2] Consistent with CEQA, economic or social effects of a project are not to be treated as significant effects on the environment (CEQA Guidelines Section 15131).

TABLE A-1 (CONTINUED)
SUMMARY OF PUBLIC COMMENTS RECEIVED IN RESPONSE TO THE NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
May 8, 2017 (cont.)	Garril Page (cont.)	• A process driven more by reliance on consultants, grant acquisition and subsequent deadlines, has resulted in wasted funding that precludes solutions that might enhance communities through better-supported local projects. This is a cultural loss.	• Chapter 1, Introduction (CEQA process)
		• When residents are forced to pay fees, yet feel unrepresented by the process, community culture suffers. Flood control as a process loses both credibility, support, and instead engenders ill-will. This is a cultural loss.	• The EIR evaluates direct, indirect, and cumulative physical effects of the project on the environment. Other effects are not subject to analysis under CEQA.
		• Biological resources effects analyses of floodwalls and structural changes should include all direct and indirect effects, including effects from root cutting.	• Section 4.5, Biological Resources
		• More information about changes to creek hydraulics and sediment transport is needed to adequately address impacts to biological resources	• Section 4.5, Biological Resources • Section 4.9, Hydrology and Water Quality
		• Sources of sediment, sediment particle sizes, and sediment analysis methods should be included in the document	• Section 4.9, Hydrology and Water Quality
		• Describe the conditions under which sediment will be deposited in the downtown reaches of San Anselmo Creek, and conditions under which sediment will be flushed into lower San Anselmo, Corte Madera, and Ross Creeks, including quantification of the transit and deposition patterns for defined, various sized sediments	• Section 4.9, Hydrology and Water Quality
		• Describe how sedimentation patterns will affect flows in downtown reaches of San Anselmo Creek	• Section 4.9, Hydrology and Water Quality
		• Describe whether the project will include testing for residual toxins at the Nursery Basin site, what testing methods may be used, and whether written testing reports will be available to homeowners and the surrounding community	• Section 4.8, Hazards and Hazardous Materials
		• Describe whether the project at the Nursery Basin will include groundwater monitoring wells and describe the monitoring process	• Section 4.9, Hydrology and Water Quality
		• Describe whether the project will include testing or monitoring to protect air, soil, and water during and after construction, whether written reports to the surrounding community will be provided for a specified period of time, and what the period of reporting will be	• Mitigation measures developed for the project are identified in Chapters 4 and 5 of this EIR; the final mitigation monitoring and reporting program will be adopted as part of project approval. (CEQA Guidelines Sections 15091 and 15097)
		• Describe efforts to coordinate with Ross Valley Sanitary District to protect from floodwater pollution associated with sewer overflow conditions, spills, and pipeline breaks or blockages during project construction and operation	• Section 4.13, Public Services and Utilities

TABLE A-1 (CONTINUED)
SUMMARY OF PUBLIC COMMENTS RECEIVED IN RESPONSE TO THE NOP

Date	Commenter (Organization)	Summary of Comment(s) or Topic(s)	EIR Topic and Section
May 8, 2017 (cont.)	Garril Page (cont.)	• Evaluation of hazards and utility service interruption should account for inconvenience, liability, and emergency response, as well as identifying entity responsible for organizing and executing plans	• Section 4.13, Public Services and Utilities
		• Describe steps that will be undertaken to help educate and prepare residents for the disruptive impacts to their daily lives by this Project	• Section 4.13, Public Services and Utilities
		• Describe emergency dewatering plans for the Nursery Basin	• Chapter 3, Project Description
		• Describe number of spillways at Nursery Basin	• Chapter 3, Project Description
		• Describe plans to dewater the Nursery Basin after each flood event, and estimate time required to empty Basin	• Chapter 3, Project Description
		• Describe whether rodent extermination is planned at Nursery Basin	• Chapter 3, Project Description
		• Identify who is responsible for Nursery Basin embankment integrity.	• Chapter 3, Project Description
		• Describe the size of the vegetative buffer surrounding the Nursery Basin.	• Chapter 3, Project Description
		• Describe how the stormwater collection system would be maintained free of leaves and debris, and which agency would be responsible for maintenance.	• Chapter 3, Project Description
		• Are there detention basins comparable to the Nursery Basin? Where are the comparable basins?	• This comment is on the merits of the proposed project and not the scope of the EIR.
		• Included by reference are comments from Garril Page on the Program EIR dated February 24, 2017	• Included by reference are responses to comments from Garril Page on the Program EIR, dated February 24, 2017.

-----Original Message-----
From: Brian Hennessy [mailto:hennessydds@comcast.net]
Sent: Thursday, April 20, 2017 8:55 PM
To: EnvPlanning
Cc: Brian Hennessy
Subject: Sunnyside Detention basin attention Rachel Reid

Rachel, I live at 16 Deer Creek Court ; the adjacent property on the western and creek side of the planned Sunnyside basin. I would hope and expect the EIR to address some hydrology questions I have. Common sense would tell me that when water is retained in the creek (first part of basin) and Sunnyside my water table will rise. When released it will fall. This will create at the very least increase settling of my house, which we've lived in for twenty five years. The increase in saturated soil under my house will also increase the risk of liquefaction. Look forward to your response, Brian

From: Richard Lee [mailto:rlbuilder@comcast.net]
Sent: Thursday, April 20, 2017 10:29 PM
To: EnvPlanning
Subject: Flood project comment

Hi Rachel,

I attended the 4/20/17 flood project meeting at San Anselmo Town Hall and made a comment at the end of the meeting regarding capacity of the creeks from downtown San Anselmo through Kentfield at the College of Marin. I'd like to follow up with a more thorough explanation of what I saw and the conclusions I draw from this winter's flood events.

For the flood events of 12/15/16, 1/10/17, and 2/7/17 I witnessed creek levels at various locations in downtown San Anselmo, Ross, and College of Marin. I also carefully followed rainfall rates and online creek level postings. I wish to call attention to conditions for the flood event on the evening of 1/10/17:

- San Anselmo flood siren sounded at approximately 7:00 pm
- Peak creek level at downtown San Anselmo was >13 feet according to the online gauge information
- Tide level at 7:30 pm was approximately +2.0 ft and rising with a high tide of +5.0 ft expected at 11:00 pm
- Flooding was beginning in downtown San Anselmo, Ross, and in the College of Marin parking lot just upstream of College Avenue.
- The entire Ross Creek canal from the concrete section through College of Marin till where it opens up to the wider, more natural portion was FULL or within an inch or two of full.
- Sir Francis Drake Blvd. through Ross was closed, I assume because of flooding there.

The overall flood project concerns much more than the snapshot I describe above, but I have to conclude that capacity of the creek in the College of Marin/Ross areas is already very similar to that of downtown San Anselmo. If that is a reasonable conclusion, then most if not all of the improvements under consideration for downtown San Anselmo will not prevent flooding. I would argue that detention basins should be of higher priority than any improvements in downtown San Anselmo until the capacity of the entire creek can be improved.

I would appreciate it if you would circulate my comments to appropriate parties. Thank you for your consideration.

Regards,
Richard

Richard Lee Fine Carpentry
101 Hilldale Drive

San Anselmo, CA 94960
415-497-1253 ph.
#874967

From: Suzuki C [mailto:suzukicady@gmail.com]
Sent: Wednesday, April 26, 2017 12:24 PM
To: EnvPlanning
Subject: Attn: Rachel Reed, comments on SAN ANSELMO FLOOD RISK REDUCTION PROJECT

Hello Rachel,

Please submit the following comments on the SAN ANSELMO FLOOD RISK REDUCTION PROJECT for its EIR:

The following letter is co-signed by 77 area residents.

Detention basins are unpopular.

Residents in San Anselmo voted down a flood basin project slated for Memorial Park in 2015.

Many residents have spoken out against their use (or their locations) at countless Flood Zone 9 Ross Valley flood advisory board meetings. Perhaps that is why the flood advisory board has chosen not to record their meetings — a bad faith policy.

Detention basins are hazardous.

Storm water surges in and out of these structures at high velocity. Storm water debris contains hazardous materials.

Following a flash flood in Hawaii, a girl drowned in a 4-ft high flood basin which had a drain blocked by debris, while trying to save a friend who had fallen in.

Las Vegas had a flash flood last year where three people drowned in municipal flood control facilities (July 1-3). One body was found in a detention basin the day after the storm, and two others were swept away and drowned in flood channels that divert water into detention basins there. One was a woman trapped by debris in the rushing waters of the channel. Rescuers tried unsuccessfully to save her. Las Vegas has spent $1.7 billion on its flood control, by the way.

Detention basins can fail.

A detention basin failed in Mesa, Arizona, due to improper maintenance, and flooded the 200 homes nearby. Since those homes weren't previously in a flood zone, the 200 residents affected did not have flood insurance. (Lots of stories like this over the past few years.)

Detention basins are susceptible to clogged drains from trash, debris and storm water detritus. They require a lot of timely maintenance.

Detention basins require dams and spillways. Levees and spillways tend to fail over time (observe the Oroville Dam and Spillway this year).

Detention basins are expensive.

Building them is extremely expensive. Maintaining them is, too — a cost with no end.

Impossible to know how well the flood basins would be maintained over time — or who will pay for all their future maintenance needs, upgrades, renovations, and retrofits.

Earthquake damage to the structures is likely at some point.

Who would be liable for any levee or spillway breaches impacting those who live downstream of them?

Detention basins don't work for the Ross Valley.

Because flood detention basins are unpopular, hazardous, expensive, and complicated, they are not the right path forward for the Ross Valley. They should be removed from its flood control program.

What can be done instead?

Matt Smeltzer, P.E. Engineer/Geomorphologist, has a submitted a powerful approach to address flooding in San Anselmo: Creek daylighting and restoration.

Downtown San Anselmo creek restoration is an extremely effective, sustainable, environmentally-friendly, less-expensive solution. Watch his presentation to the San Anselmo Town Council (link below).

Let's proceed down that path.

Thank you,
Suzuki Cady, Fairfax; Dine DeMarlie, Fairfax; Doug Addis, Fairfax; Kelly Alpert, Fairfax; Richard Alpert, Fairfax; Ling Shien Bell, Fairfax; Mark Bell, Fairfax; Claudia Belshaw, Fairfax; David Belshaw, Fairfax; Patty Bredt, Fairfax; Wendy Botwin, Fairfax; Tracy Brien, Fairfax (business); Ellen Caldwell, San Anselmo; Susanne Chaney, Fairfax; Nancy Clothier, Fairfax; Jim Collier, Fairfax; Dottie Escue, Fairfax; Ellen Floyd, Fairfax; Evangeline Fugazzotto, Fairfax; Cormac Gannon, Fairfax; Marc Hammerman, Fairfax; Nancy Hammerman, Fairfax; Sandy Handsher, Fairfax; Pamela Hayes, Fairfax; Jim Hill, Fairfax; Karl Hoagland, Fairfax; Janet Knudsen, Fairfax; Russell Knudsen, Fairfax; Gail Koffman, Fairfax; Janusz Kolodziejczyk, Fairfax; Henry Kyburg, Fairfax; Jennifer Laursen, Fairfax; Stefan Laursen, Fairfax; Ralph Lewin, Fairfax; Lindsay London Stocker, Fairfax; Christine Margetic, Fairfax; Merrell Maschino, Fairfax; Petra McClinton, Fairfax; Katya McCullogh, San Anselmo; Rick Meissner, Fairfax; Glenn Miwa, Fairfax, San Anselmo (business); Laura Miwa, Fairfax, San Anselmo (business); Nancy Morita, Fairfax; Megan Murdock, Fairfax; Robert Murdock, Fairfax; Joseph Odom, Fairfax; Nancy Okada, San Anselmo; Garril Page, San Anselmo; Diana Perdue, Fairfax; Jamie Redford, Fairfax; Kyle Redford, Fairfax; Tina Salter, Fairfax; Otis Scarecroe, Fairfax; Akiko Schertell, Fairfax; Cathy Shea, Fairfax; George Shea, Fairfax; Cristina Simmons, Fairfax; John Simmons, Fairfax; Sabrina Simmons, Fairfax; Douglas Smith, Fairfax; Mark Solomons, Fairfax; Michael Stocker, Forest Knolls; George Taylor, Fairfax; Ben Tedder, Fairfax; Camila Tedder, Fairfax; Claire Thuesen, Fairfax; Thue Thuesen, Fairfax; Claudia Tomaso, Fairfax; Lew Tremaine, Fairfax; Martha Ture, Fairfax; Michael Van Metre, Fairfax; Bryan

Vidinsky, San Anselmo; Tom Vogelheim, Fairfax; Scott Walker, Fairfax; Birgit Wick, Fairfax; Mark Woodrow, Fairfax; Gordon Wright, Fairfax

Links to Sources:

http://bit.ly/2oxcMeB (Research Assessing the Safety Hazards Associated with Detention Basins)
twitter.com/SaveLeftyGomez (links to multiple articles)
www.saveleftygomez.com/news (links to multiple articles)
Matt Smeltzer's Creek Restoration presentation to San Anselmo Town Council, 10/25/16 (Agenda Item 10)
http://bayareane.ws/2qfq2AP (Greener Solutions article by Warren Karlenzig)
http://www.saveleftygomez.com/detention-basin-failures.html (links to multiple articles)
http://www.saveleftygomez.com/ (Save White Hill School/Lefty Gomez Field)
http://www.facebook.com/saveleftygomez/ (links to multiple articles)

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
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April 28, 2017

Rachel Reid
Marin County

Sent by Email: EnvPlanning@marincounty.org

RE: SCH#2017042041, San Anselmo Flood Risk Reduction Project, Marin County

Dear Ms. Reid:

The Native American Heritage Commission has received the Notice of Preparation (NOP) for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of <u>portions</u> of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

<u>AB 52</u>

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. <u>Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project</u>: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or

tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
   b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at:
https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: sharaya.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst
cc: State Clearinghouse

From: Kathleen Gundry [mailto:kgundry@verizon.net]
Sent: Sunday, April 30, 2017 9:08 PM
To: EnvPlanning
Cc: wmaly@verizon.net
Subject: San Anselmo Flood Risk Reduction Project EIR Scoping Comments

To: Rachel Reid, Environmental Planner, Marin County Community Development Agency

From: Kathleen Gundry and Bill Maly, 70 Barber Ave, San Anselmo, CA 949660

Re: San Anselmo flood risk reduction EIR/Programmatic EIR for the Ross Valley watershed

We are San Anselmo residents who own a home on San Anselmo Creek. Though our house is too high to be at risk of flooding, we want our community to be protected from frequent floods so that downtown merchants no longer lose revenue days and other neighbors do not have to live in fear of flood waters in their homes every time it rains.

We attended the EIR scoping meeting on April 20, 2017, at the San Anselmo Town Hall to learn about the project and the EIR process. These comments address the proposed San Anselmo Flood Risk Reduction project within the context of the broader Ross Valley project. We hope these comments can be used to shape the composition of the project or the evaluated alternatives with the intent of reducing environmental impacts on water quality and stream health, while meeting the objectives of flood risk reduction in San Anselmo and in the broader Ross Valley.

Project Design. Current Project components seem to be mostly focused on two types of relatively large-scale engineering solutions to reduce flood risk: (1) retention basins to keep a percentage of the water from flowing through the creek during storm events, and (2) flood walls and channel changes to speed up creek flow. We suggest that the county consider broadening the scope of the project or including in the evaluated alternatives a program of distributed Best Management Practices in residential and commercial design—such as rain gardens, rain barrels and cisterns, and other infrastructure projects like green streets.

Project objectives. The flooding problem is closely linked to stream health. If the main objective is to alleviate flooding, this leads to a project design aimed at speeding up creek flow, which is not conducive to a healthy stream environment. We suggest that the project objectives include water quality and habitat objectives. This would ensure that the EIR would include measurement of stream pollution, microorganism content, and species diversity, and address those impacts and measures to mitigate them. We also want to make sure the long-overdue solution to San Anselmo's flooding problem does not worsen the situation for our downstream neighbors and thereby create the need for other large-scale engineering projects downstream to deal with increased water flows.

A project design that seeks to reduce runoff by reducing impervious surfaces and capturing water in a variety of ways may also be able to reduce the speed of creek flow—by reducing runoff from neighborhoods into the creek—thus improving stream health and reducing the potential downstream impacts of flooding and pollution runoff during a storm event. Though planning for improvement of storm water management in the watershed may seem like a long-term goal that will not provide immediate relief from flooding, it seems imperative in light of the inevitable sea-level rise and its impact on Marin communities. In addition, a healthy stream environment could be an asset to the aesthetics of the community, facilitating development of creek-focused development to replace the current structures that essentially cover the creek with concrete buildings.

While solutions associated with the Army Corps of Engineers are probably a necessary part of the plan to reduce flooding, we would like to see the plan take a more expansive, environmentally responsible approach. Here are a few links that you may find useful in considering an enhanced storm water management program:

Center for Watershed Protection (www.cwp.org).

City of Philadelphia's plans for green storm water management: http://www.phillywatersheds.org/what_were_doing/documents_and_data/cso_long_term_control_plan

City of Los Angeles storm water management planning programs:

- http://www.lastormwater.org/
- Low Impact Development guides and ordinances: http://www.lastormwater.org/green-la/
- Detailed watershed management plans that incorporate low impact development: http://www.lastormwater.org/green-la/enhanced-watershed-management-program/

We look forward to the next steps in the EIR process and hope that the project that takes shape will benefit the immediate San Anselmo community and the greater Ross Valley and San Francisco Bay.

Kathleen Gundry and Bill Maly

70 Barber Ave.

San Anselmo, CA 94960

-----Original Message-----
From: Jean Jung [mailto:jeanmjung@earthlink.net]
Sent: Monday, May 08, 2017 10:26 PM
To: EnvPlanning
Subject: flood mitigation issues.

I have owned property in fairfax since 1972. I also now am a part owner of a building at 574 San Anselmo Ave. San Anselmo, CA.I have owned and operated Gold Dreams Jewelry in San Anselmo since 1989. I have witnessed and have been impacted by the flood of 1982, 1987 and 2005.

I strongly oppose the suggested removal of 634-636 San Anselmo Ave. Removing the buildings in no way would guarantee the area wouldn't flood but it would destroy the downtown business community.

If the creek was dredged and the weir removed that would help water flow. I would think that creating a catch basin in the park on the opposite side of the creek from 634-636 would help water flow. Making the creek wider from the park side would also make water flow easier. If flood gates were created along the creek depositing water in to a detainment area built under the park and then releasing the water as the flow decreased is an idea that seems to have merit. This would be in addition to a possible basin in Fairfax.

It was stated that removing the building was the most economical solution which makes no sense to me. Purchasing buildings and then paying to have them demolished destroying the businesses along San Anselmo while the work was being done and then the aftermath of people no longer coming down to the avenue since they would no longer think about shopping there would create a serious drain on the economy of San Anselmo. Much of the loss of business and revenue can not be measured in an economic forecast. Additionally the lives of the business owners and members of the community would be seriously impacted in a negative way.

There are many ideas as to ways to solve the flooding issue in Fairfax, San Anselmo and the other towns in the Ross valley. It seems like a broader view of the possibilities would help find a solution that would save the buildings and the business community.

Sincerely,

Jean M. Jung
415 453-3050

Comment on Project EIR

May 8. 2017

My comment is primarily on Alternative 2A, Removal of Building Bridge 2 (# 634-636 San Anselmo Ave), creek improvements/flood barriers, and Nursery Detention Basin, which may include creek alterations and removal of the Winship Bridge.

Undeniably, ambiance, and San Anselmo's small town character are a major part of San Anselmo's appeal. To the extent this perception is lessened, the entire community and surrounding area are adversely affected.

1. Aesthetics and Visual Resources

a.) Flooding in downtown San Anselmo is historic, a condition that has been recognized for decades. This Project is new. Comparing the effects of flooding versus the effects of the proposed Project is appropriate, and the comparison of beneficial and adverse effects on all stakeholders should be as thorough as the review of other Environmental Effects. Lines of sandbags can be viewed as deleterious or as a sign of community spirit and resilience.

b.) At the May 3, 2017, merchants' meeting, several commenters identified negative impacts already experienced by residents and merchants in downtown areas due to their inclusion in, or proximity to, this project. The EIR should include the potential of this project, even in concept stage, as a deterrent to good community relations which then translate into quantifiable impacts on Aesthetics and Visual resources.

c.) Adversarial attitudes over a structure that is perceived to be responsible for flooding can cause great harm even without a project: less business, empty storefronts, and unpleasant associations do not add to San Anselmo's "ambiance". Where future vacancies and loss of current amenities result from Project, these diminish the community as well as individuals.

d.) Those affected by the Nursery Basin, including those homeowners who felt compelled to defensive legal action, can be included under (b.) above and consideration of the Nursery Basin neighbors' community relations applies equally to (c.) above which affects Land Use, Population and Housing also.

e.) The Nursery Basin site should clearly identify both positive and negative elevations of the basin's design in terms of pre-project ground levels. This is an obvious Aesthetic and Visual Resource effect needing documentation and inclusion.

d.) All floodwalls and structural changes should document both above grade and below grade changes as these affect Aesthetic and Visual Resources both immediately and well into the future. For example, trees that suffer root cuts, may take years to to die.

2. Cultural Resources

a.) To the degree relationships and social behaviors in downtown San Anselmo, the Nursery Basin community, and the Winship Bridge neighborhood become divisive, fragmented by the Project and influences of the flawed Project process, these are identifiable as cultural losses. There have been Project and Program presentations which cause confusion and dissension instead of enabling real progress toward a shared goal. Factual errors about the Project/Program are acknowledged in public meetings, yet left uncorrected. Meeting protocols have stifled public participation, creating frustration.

b.) A process driven more by reliance on consultants, grant acquisition and subsequent deadlines, has resulted in wasted funding that precludes solutions that might enhance communities through better-supported local projects. This is a cultural loss.

c.) When residents are forced to pay fees, yet feel unrepresented by the process, community culture suffers. Flood control as a process loses both credibility, support, and instead engenders ill-will. This is a cultural loss.

3. Biological Resources, Water Quality

a.) All floodwalls and structural changes should document both above grade and below grade changes because these affect Biological Resources both immediately and well into the future. Vegetation that suffers root damage may take years to to die. Impacts on creek resources, riparian and benthic losses may take several years to become apparent.

b.) Hydraulic changes caused by altered sediment deposition and transit patterns heavily impact creek modification projects. Comments on the critical topic of Biological Resources in and along San Anselmo Creek are impeded because the Project is not designed, hydraulic models are incomplete, discharge and channel capacities are unknown.

c.) What are the sources of sediment deposition being studied?

d.) Under what conditions will additional sediment deposit in the downtown reaches of San Anselmo Creek, how will this affect flows, what maintenance will be required, and who will be charged with the performance of this maintenance?

e.) Under what conditions will sediment be flushed downstream into lower San Anselmo, Corte Madera and Ross Creeks? The response should include quantification of the transit and deposition patterns for defined, various sized sediment?

f.) What sediment particle sizes are being studied and what analysis methods considered appropriate to the studies being performed?

g.) Prior uses of the Nursery Basin may result in toxic residues at the site. Will the project include testing to assure there are no residual toxins? What methods of testing? What assurances will be made to neighboring homeowners? Will these include written reports to the surrounding community?

4. Natural Resources, Soils, Hazards, Water Quality

a.) Past uses of the Nursery Basin may result in a toxic subterranean plume moving toward neighboring homes. Will the project include monitoring wells? What will be the monitoring process: depth, type and frequency of testing, and will it include providing reports to homeowners?

b.) Will the project include testing to assure safe air, soil, water during and after construction? What assurances will be made to neighboring homeowners? Will these include written reports to the surrounding community for a specified period? If so, define the period of time?

5. Utilities and Service Systems

a.) Floodwaters are known to spread pollution. What efforts will be made to assure the Project coordinates with RVSD to assure protection from sewer overflow conditions, spills, breaks and blockages both during and post-construction?

b.) Hazards and interruption to electric and gas services should take full account of all aspects of inconvenience and liability, including plans for emergency response. Who is responsible for organizing and execution of these plans?

c.) What steps will be undertaken to help educate and prepare residents for the disruptive impacts to their daily lives by this Project?

6. Land Use and Planning, Parks & Recreation, Hazards

a.) Recent flood events have been during serial storms. What plans exist for dewatering the Nursery Basin on an emergency basis? Detail the design plans for freeboard allowance and emergency spillway use.

b.) How many spillways will the Nursery Basin have?

c.) Detention basins that impound water between events pose a hazard, especially if the Nursery Basin is used as a park or recreational area. What design and plans exist for completely dewatering the basin after each event? How much time is needed to empty the basin?

d.) What means of rodent extermination is planned for the Nursery Basin?

Who is responsible for maintaining embankment integrity?

e.) The nursery basin is located in a wooded area. What size vegetative buffer is planned?

f.) How will the stormwater collection system be maintained free of leaves and debris? Who is responsible for this task?

g.) Basin sites shown in community meeting presentations are multiple-acre, flat, sunny, grassy areas with gradually-sloped, low embankment walls and located in a floodplain. The Nursery Basin site appears unlike any sites in those presentation slides and photographs. Are there detention basins comparable to the Nursery Basin? Where are the comparable basins?

Since there is overlap between the Program and Project EIRs and in order to minimize repetition, I include by reference relevant portions of my Comment on the PEIR, dated Feb 24, 2017, attached below.

Thank you for the opportunity Comment on the Project EIR.

//s//

Garril Page
San Anselmo.

(1)

(PLEASE PRINT LEGIBLY) Date: 4/20/17

Project EIR: SA Flood Risk Reduction

MARIN COUNTY ENVIRONMENTAL REVIEW
PUBLIC SCOPING SESSION
PUBLIC TESTIMONY SIGN-IN CARD

Name: Sandy Guldman

Email:

Representing: Friends of CM Creek

Please submit this card to staff; and
LIMIT YOUR COMMENTS TO 3 MINUTES MAXIMUM.

(2)

(PLEASE PRINT LEGIBLY) Date: 4/20/2017

Project EIR:

MARIN COUNTY ENVIRONMENTAL REVIEW
PUBLIC SCOPING SESSION
PUBLIC TESTIMONY SIGN-IN CARD

Name: ANNE PETERSEN

Email: annepeterson129@gmail.com

Representing: Kentfield

- Please submit this card to staff; and
- **LIMIT YOUR COMMENTS TO 3 MINUTES MAXIMUM.**

(3)

(PLEASE PRINT LEGIBLY) Date: APRIL 20, 2017

Project EIR: San Anselmo

MARIN COUNTY ENVIRONMENTAL REVIEW
PUBLIC SCOPING SESSION
PUBLIC TESTIMONY SIGN-IN CARD

Name: ~~John Bartolomi~~ withdrew

Email: john.bartolomi@outlook.com

Representing: John Bartolomi - Homeowner

- Please submit this card to staff; and
- **LIMIT YOUR COMMENTS TO 3 MINUTES MAXIMUM.**

(4)

(PLEASE PRINT LEGIBLY) Date: April 19 2016

Project EIR:

MARIN COUNTY ENVIRONMENTAL REVIEW
PUBLIC SCOPING SESSION
PUBLIC TESTIMONY SIGN-IN CARD

Name: Garrett Page

Email: [illegible]

Representing:

- Please submit this card to staff; and
- **LIMIT YOUR COMMENTS TO 3 MINUTES MAXIMUM.**

(5)

(PLEASE PRINT LEGIBLY) Date:

Project EIR:

MARIN COUNTY ENVIRONMENTAL REVIEW
PUBLIC SCOPING SESSION
PUBLIC TESTIMONY SIGN-IN CARD

Name: LISE STAMPFLI JORANE

Email: LSTAMPFLI@EARTHLINK.net

Representing: Flood Mitigation League of Ross Valley

- Please submit this card to staff; and
- **LIMIT YOUR COMMENTS TO 3 MINUTES MAXIMUM.**

APPENDIX B

Air Quality Calculations

Table of Contents

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B-1 Summary Tables

Tables for EIR

Updated: 4/16/2018

Green = use in EIR

Alt 4 Nursery Site Detention Basin - Option 6
Alt 2 Nursery Site Detention Basin - Option 7

Impact Summary

Alternative	Impact compared to project 4.3-1	4.3-2	4.3-3	4.3-4	4.3-5	4.3-6
Alternative 2 (Option 7)	Greater Than	Same As	Less Than	Less Than	Same As	Less Than
Alternative 4 (Option 6)	Less Than	Same As	Less Than	Greater Than	Same As	Greater Than

	Activity WorkDays	Off-Road hrs	Total Truck T	Haul Truck Tr	Construction, Unmit Daily NOx	Total DPM	Total Cancer	HI (Res)	PM2.5 (Res)	Operational Emissions, Unmit Daily NOx	Total GHGs
Project	147	5,588	4,141	2,663	32.1	138.49	34.6	6.6	0.47	0.332	553.5
Alternative 2 (Option 7)	113	4,438	4,712	3,459	49.5	132.22	21.9	5.9	0.45	0.332	549.1
Alternative 4 (Option 6)	165	6,508	5,350	3,628	31.3	156.19	42.0	8.8	0.48	0.332	674.6
Percent change compared to project											
Alternative 2 (Option 7)	-23%	-21%	14%	30%	54%	-5%	-37%	-11%	-4%	0%	-1%
Alternative 4 (Option 6)	12%	16%	29%	36%	-2%	13%	21%	34%	3%	0%	22%

Criteria Pollutant Tables

CONSTRUCTION

Source	Unmitigated Average Daily Emissions (lbs/day) ROG	NO_X	Exhaust PM10	Exhaust PM2.5	Mitigated Average Daily Emissions (lbs/day) ROG	NO_X	Exhaust PM10	Exhaust PM2.5
Nursery Site Detention Basin								
Off-Road Equipment	1.0	11.3	0.5	0.5	0.3	6.3	<0.1	<0.1
On-Road Trucks	0.7	14.4	0.2	0.2	0.7	14.4	0.2	0.2
Worker Trips	0.3	0.2	<0.1	<0.1	0.3	0.2	<0.1	<0.1
Subtotal	*2.0*	*25.8*	*0.8*	*0.7*	*1.3*	*20.9*	*0.4*	*0.3*
Bridge Building #2 Demolition and Riparian Restoration								
Off-Road Equipment	0.6	5.7	0.3	0.3	0.2	4.1	<0.1	<0.1
On-Road Trucks	0.4	6.3	<0.1	<0.1	0.4	6.3	<0.1	<0.1
Worker Trips	0.3	0.2	<0.1	<0.1	0.3	0.2	<0.1	<0.1
Subtotal	*1.2*	*12.2*	*0.4*	*0.4*	*0.8*	*10.7*	*0.2*	*0.2*
Nursery Site Detention Basin - Option 6								
Off-Road Equipment	1.1	11.4	0.5	0.5	0.3	6.7	<0.1	<0.1
On-Road Trucks	0.9	17.3	0.3	0.3	0.9	17.3	0.3	0.3
Worker Trips	0.3	0.2	<0.1	<0.1	0.3	0.2	<0.1	<0.1
Subtotal	*2.2*	*28.9*	*0.8*	*0.7*	*1.5*	*24.1*	*0.4*	*0.4*
Nursery Site Detention Basin - Option 7								
Off-Road Equipment	0.9	9.8	0.4	0.4	0.3	5.5	<0.1	<0.1
On-Road Trucks	1.1	21.7	0.3	0.3	1.1	21.7	0.3	0.3
Worker Trips	0.3	0.2	<0.1	<0.1	0.3	0.2	<0.1	<0.1
Subtotal	*2.3*	*31.8*	*0.8*	*0.7*	*1.6*	*27.5*	*0.5*	*0.4*
Total Average Daily Emissions								
Project	**2.7**	**32.1**	**1.0**	**0.9**	**1.7**	**26.3**	**0.5**	**0.4**
Alt 4 - Option 6	**2.5**	**31.3**	**0.9**	**0.8**	**1.7**	**26.4**	**0.5**	**0.4**
Alt 2 - Option 7	**3.8**	**49.5**	**1.4**	**1.2**	**2.7**	**42.9**	**0.8**	**0.7**
BAAQMD Construction Threshold	**54**	**54**	**82**	**54**	**54**	**54**	**82**	**54**
Exceeds Threshold?								
Project	No	No	No	No	No	No	No	No
Alt 4 - Option 6	No	No	No	No	No	No	No	No
Alt 2 - Option 7	No	No	No	No	No	No	No	No
Alternative 2 (Option 7)	41.5%	54.2%	37.5%	38.6%	53.9%	62.8%	62.6%	66.8%
Alternative 4 (Option 6)	-5.0%	-2.3%	-5.6%	-5.1%	-2.8%	0.2%	-0.3%	1.2%

NOT THE SUM - see below

Impact 4.3-1 Summary	Compared to project
Alternative 2 (Option 7)	Greater Than
Alternative 4 (Option 6)	Less Than

Actual Data: Average lbs/day	ROG	NOX	PM10 Exh	PM2.5 Ex	ROG	NOX	PM10 Exh	PM2.5 Ex	*WorkDays*
Nursery Site Detention Basin									
Off-Road	1.0449	11.2818	0.4848	0.4519	0.3181	6.3098	0.0675	0.0675	*147*
Haul Trucks	0.4480	11.8272	0.1907	0.1824	0.4480	11.8272	0.1907	0.1824	*147*
Onsite trucks	0.2721	2.5322	0.0279	0.0267	0.2721	2.5322	0.0279	0.0267	*147*
Worker	0.2746	0.2051	0.0670	0.0282	0.2746	0.2051	0.0670	0.0282	*147*
Bridge Building #2 Demolition and Riparian Restoration									
Off-Road	0.5859	5.6848	0.2802	0.2623	0.2212	4.1387	0.0654	0.0654	*75*
Haul Trucks	0.1901	5.0190	0.0809	0.0774	0.1901	5.0190	0.0809	0.0774	*75*
Onsite trucks	0.1621	1.3220	0.0154	0.0147	0.1621	1.3220	0.0154	0.0147	*75*
Worker	0.2746	0.2051	0.0670	0.0282	0.2746	0.2051	0.0670	0.0282	*75*
Nursery Site Detention Basin - Option 6									
Off-Road	1.0847	11.4431	0.4996	0.4672	0.3411	6.6557	0.0793	0.0793	*165*
Haul Trucks	0.5409	14.2794	0.2302	0.2203	0.5409	14.2794	0.2302	0.2203	*165*
Onsite trucks	0.3143	3.0061	0.0328	0.0313	0.3143	3.0061	0.0328	0.0313	*165*
Worker	0.2746	0.2051	0.0670	0.0282	0.2746	0.2051	0.0670	0.0282	*165*
Nursery Site Detention Basin - Option 7									
Off-Road	0.9345	9.8455	0.4298	0.4030	0.2933	5.5438	0.0732	0.0732	*113*
Haul Trucks	0.6806	17.9668	0.2897	0.2771	0.6806	17.9668	0.2897	0.2771	*113*
Onsite trucks	0.3839	3.7767	0.0408	0.0389	0.3839	3.7767	0.0408	0.0389	*113*
Worker	0.2746	0.2051	0.0670	0.0282	0.2746	0.2051	0.0670	0.0282	*113*
Total Average Daily Emissions									

Project	2.6584	32.0865	0.9967	0.8844	1.7455	26.3257	0.4698	0.3995	*147*
Alt 1 - Option 6	2.5242	31.3369	0.9407	0.8394	1.6959	26.3689	0.4686	0.4043	*165*
Alt 2 - Option 7	3.7627	49.4782	1.3705	1.2260	2.6865	42.8560	0.7640	0.6663	*113*
	unmitigated	*unmitigated*	*unmitigated*	*unmitigated*	*mitigated*	*mitigated*	*mitigated*	*mitigated*	

OPERATION

Source	Average Daily Emissions (lbs/day)				Maximum Annual Emissions (tons/year)			
	ROG	NO_X	PM10	PM2.5	ROG	NO_X	PM10	PM2.5
Nursery Site Detention Basin								
Off-Road Equipment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
On-Road Trucks	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Worker Trips	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	*<0.1*	*0.3*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Bridge Building #2 Demolition and Riparian Restoration								
Off-Road Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
On-Road Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worker Trips	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Nursery Site Detention Basin - Option 6								
Off-Road Equipment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
On-Road Trucks	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Worker Trips	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	*<0.1*	*0.3*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Nursery Site Detention Basin - Option 7								
Off-Road Equipment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
On-Road Trucks	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Worker Trips	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pump	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	*<0.1*	*0.3*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*
Total Average Daily Emissions								
Project	**<0.1**	**0.3**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Alt 1 - Option 6	**<0.1**	**0.3**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Alt 2 - Option 7	**<0.1**	**0.3**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
BAAQMD Construction Threshold	**54**	**54**	**82**	**54**	**54**	**54**	**82**	**54**
Exceeds Threshold?								
Project	No	No	No	No	No	No	No	No
Alt 4 - Option 6	No	No	No	No	No	No	No	No
Alt 2 - Option 7	No	No	No	No	No	No	No	No

Impact 4.3-3	
Summary	**Compared to project**
Alternative 2 (Option 7)	Less Than
Alternative 4 (Option 6)	Less Than

	Lbs/day				Tons/Year				
Actual Data: Average lbs/day	**ROG**	**NOX**	**PM10 T**	**PM2.5 T**	**ROG**	**NOX**	**PM10 T**	**PM2.5 T**	
Nursery Site Detention Basin									
Off-Road	0.0059	0.0652	0.0021	0.0020	0.0011	0.0119	0.0004	0.0004	
On-Road Trucks	0.0103	0.2659	0.0041	0.0039	0.0019	0.0485	0.0008	0.0007	
Worker Trips	0.0015	0.0011	0.0004	0.0002	0.0003	0.0002	0.0001	0.0000	
Pump	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Subtotal	0.0178	0.3323	0.0066	0.0060	0.0081	0.0606	0.0012	0.0011	
Bridge Building #2 Demolition and Riparian Restoration									
Off-Road Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	no emissions
On-Road Trucks	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Worker Trips	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Pump	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Subtotal	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Nursery Site Detention Basin - Option 6									
Off-Road	0.0059	0.0652	0.0021	0.0020	0.0011	0.0119	0.0004	0.0004	same as project
On-Road Trucks	0.0103	0.2659	0.0041	0.0039	0.0019	0.0485	0.0008	0.0007	
Worker Trips	0.0015	0.0011	0.0004	0.0002	0.0003	0.0002	0.0001	0.0000	
Pump	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Subtotal	0.0178	0.3323	0.0066	0.0060	0.0032	0.0606	0.0012	0.0011	
Nursery Site Detention Basin - Option 7									
Off-Road	0.0059	0.0652	0.0021	0.0020	0.0011	0.0119	0.0004	0.0004	same as project
On-Road Trucks	0.0103	0.2659	0.0041	0.0039	0.0019	0.0485	0.0008	0.0007	
Worker Trips	0.0015	0.0011	0.0004	0.0002	0.0003	0.0002	0.0001	0.0000	
Pump	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Subtotal	0.0178	0.3323	0.0066	0.0060	0.0032	0.0606	0.0012	0.0011	
Total Average Daily Emissions									
Project	0.0178	0.3323	0.0066	0.0060	0.0081	0.0606	0.0012	0.0011	
Alt 4 - Option 6	0.0178	0.3323	0.0066	0.0060	0.0032	0.0606	0.0012	0.0011	
Alt 2 - Option 7	0.0178	0.3323	0.0066	0.0060	0.0032	0.0606	0.0012	0.0011	
	unmitigated	*unmitigated*	*unmitigated*	*unmitigated*					

HRA Tables

CONSTRUCTION

CANCER RISK — **Unmitigated**

Element	Cancer Risk			Chronic Hazard Index		
	Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor
Nursery Site Detention Basin						
Maximum Cancer Risk	34.6	0.0	3.4	0.1	0.0	<0.1
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**
Exceeds Threshold?	Yes	No	No	No	No	No
Bridge Building #2 Demolition and Riparian Restoration						

Actual Values

Cancer Risk			Chronic Hazard Index		
Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor
34.60	0.00	3.44	0.108	0.000	0.083

Maximum Cancer Risk	18.0	2.1	0.3	0.2	<0.1	<0.1		18.03	2.06	0.30	0.186	0.011	0.014
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	Yes	No	No	No	No	No							
Nursery Site Detention Basin - Option 6													
Maximum Cancer Risk	42.0	0.0	4.0	0.1	0.0	<0.1		42.00	0.00	3.99	0.110	0.000	0.085
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	Yes	No	No	No	No	No							
Nursery Site Detention Basin - Option 7													
Maximum Cancer Risk	21.9	0.0	2.5	0.1	0.0	<0.1		21.86	0.00	2.50	0.102	0.000	0.079
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	Yes	No	No	No	No	No							
Alternative 2 (Option 7)	-36.8%	#DIV/0!	-27.3%	-4.9%	#DIV/0!	-4.9%							
Alternative 4 (Option 6)	21.4%	#DIV/0!	15.8%	2.7%	#DIV/0!	2.7%							

Impact 4.3-4

Summary	Compared to project
Alternative 2 (Option 7)	Less Than
Alternative 4 (Option 6)	Greater Than

Mitigated

Element	Cancer Risk			Chronic Hazard Index									
	Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor							
Nursery Site Detention Basin													
Maximum Cancer Risk	6.6	0.0	0.7	<0.1	0.0	<0.1	4.04	6.56	0.00	0.65	0.020	0.000	0.016
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	No	No	No	No	No	No							
Bridge Building #2 Demolition and Riparian Restoration													
Maximum Cancer Risk	5.6	0.6	<0.1	<0.1	<0.1	<0.1	4.56	5.61	0.64	0.09	0.058	0.003	0.004
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	No	No	No	No	No	No							
Nursery Site Detention Basin - Option 6													
Maximum Cancer Risk	8.8	0.0	0.8	<0.1	0.0	<0.1	5.29	8.76	0.00	0.83	0.023	0.000	0.018
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	No	No	No	No	No	No							
Nursery Site Detention Basin - Option 7													
Maximum Cancer Risk	5.9	0.0	0.7	<0.1	0.0	<0.1	4.02	5.86	0.00	0.67	0.027	0.000	0.021
BAAQMD Cancer Threshold	**10**	**10**	**10**	**1**	**1**	**1**							
Exceeds Threshold?	No	No	No	No	No	No							

PM2.5 CONCENTRATIONS

Element	**Unmitigated** Average Annual PM2.5 Exhaust Concentrations (ug/m3)			**Mitigated** Average Annual PM2.5 Exhaust Concentrations (ug/m3)			**Actual Values Unmitigated** Average Annual PM2.5 Exhaust Concentrations (ug/m3)			**Mitigated** Average Annual PM2.5 Exhaust Concentrations (ug/m3)		
	Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor	Residential Receptor	Daycare Receptor	School Receptor
Nursery Site Detention Basin												
Average Annual PM2.5 Exhaust Concent	0.47	0.00	0.36	0.10	0.00	0.08	0.47	0.00	0.36	0.10	0.00	0.08
BAAQMD Cancer Threshold	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**						
Exceeds Threshold?	Yes	No	Yes	No	No	No						
Bridge Building #2 Demolition and Riparian Restoration												
Average Annual PM2.5 Exhaust Concent	0.82	0.05	0.06	0.28	0.02	0.02	0.82	0.05	0.06	0.28	0.02	0.02
BAAQMD Cancer Threshold	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**						
Exceeds Threshold?	Yes	No	No	No	No	No						
Nursery Site Detention Basin - Option 6												
Average Annual PM2.5 Exhaust Concent	0.48	0.00	0.37	0.11	0.00	0.09	0.48	0.00	0.37	0.11	0.00	0.09
BAAQMD Cancer Threshold	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**						
Exceeds Threshold?	Yes	No	Yes	No	No	No						
Nursery Site Detention Basin - Option 7												
Average Annual PM2.5 Exhaust Concent	0.45	0.00	0.35	0.13	0.00	0.10	0.45	0.00	0.35	0.13	0.00	0.10
BAAQMD Cancer Threshold	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**						
Exceeds Threshold?	Yes	No	Yes	No	No	No						
Alternative 2 (Option 7)	-3.6%	#DIV/0!	-3.6%	#DIV/0!	33.0%	#REF!						
Alternative 4 (Option 6)	3.4%	#DIV/0!	3.4%	#DIV/0!	13.3%	#REF!						

Impact 4.3-4

Summary	Compared to project
Alternative 2 (Option 7)	Less Than
Alternative 4 (Option 6)	Greater Than

GHG Tables

Source	Total Annual Emissions (metric tons)		
	Construction	Operation	Cons+Ops
Nursery Site Detention Basin			
Off-Road Equipment	120.4	16.0	136.4
On-Road Trucks	281.6	12.9	294.5
Worker Trips	31.6	0.4	32.0
Subtotal	*433.6*	*29.3*	*462.9*
Bridge Building #2 Demolition and Riparian Restoration			
Off-Road Equipment	38.1	0.0	38.1
On-Road Trucks	65.8	0.0	65.8
Worker Trips	16.1	0.0	16.1
Subtotal	*120.0*	*0.0*	*120.0*
Nursery Site Detention Basin - Option 6			
Off-Road Equipment	141.1	16.0	157.1
On-Road Trucks	378.1	12.9	391.0
Worker Trips	35.5	0.4	35.9
Subtotal	*554.6*	*42.8*	*597.5*
Nursery Site Detention Basin - Option 7			

Off-Road Equipment	81.2	16.0	97.2
On-Road Trucks	323.7	12.9	336.5
Worker Trips	24.3	0.4	24.7
Subtotal	*429.1*	*29.3*	*458.4*
Total Annual Emissions			
Project	553.5	29.3	582.8
Alt 4 - Option 6	674.6	42.8	717.4
Alt 2 - Option 7	549.1	29.3	578.4
Total Emissions Amortized over 30 Years			
Project	18.5	29.3	47.8
Alt 4 - Option 6	22.5	42.8	65.3
Alt 2 - Option 7	18.3	29.3	47.6
BAAQMD Threshold	**1,100**	**1,100**	**1,100**
Exceeds Threshold?			
Project	No	No	No
Alt 4 - Option 6	No	No	No
Alt 2 - Option 7	No	No	No
Alternative 2 (Option 7)	-0.8%		
Alternative 4 (Option 6)	21.9%		

Impact 4.3-6			
Summary	**Compared to project**		
Alternative 2 (Option 7)	Less Than	Less Than	Less Than
Alternative 4 (Option 6)	Greater Than	Greater Than	Greater Than

Actual Data: Annual MTCO2e	Construction CO2e	Operation CO2	Cons+Ops CO2e	
Nursery Site Detention Basin				
Off-Road	120.40	15.99	136.39	
Haul Trucks	235.64	12.89	248.53	
Onsite trucks	45.92		45.92	
Worker	31.61	0.43	32.04	
Pump	0.00	0.00	0.00	
Subtotal	433.57	29.31	462.88	
Bridge Building #2 Demolition and Riparian Restoration				
Off-Road	38.08	0.00	38.08	no emissions
On-Road Trucks	51.02	0.00	51.02	
Onsite trucks	14.74		14.74	
Worker	16.13	0.00	16.13	
Pump	0.00	0.00	0.00	
Subtotal	119.96	0.00	119.96	
Nursery Site Detention Basin - Option 6				
Off-Road	141.09	15.99	157.08	
On-Road Trucks	319.34	12.89	332.23	
Onsite trucks	58.72		58.72	
Worker	35.48	0.43	35.91	
Pump	0.00	13.53	13.53	
Subtotal	554.63	42.84	597.47	
Nursery Site Detention Basin - Option 7				
Off-Road	81.18	15.99	97.17	
On-Road Trucks	275.17	12.89	288.06	
Onsite trucks	48.48		48.48	
Worker	24.30	0.43	24.73	
Pump	0.00	0.00	0.00	
Subtotal	429.13	29.31	458.44	
Total Average Annual Emissions				
Project	553.53	29.31	582.84	
Alt 4 - Option 6	674.59	42.84	717.43	
Alt 2 - Option 7	549.09	29.31	578.40	Assumes all during 1 year
Total Emissions Amortized over 30 Years				
Project	18.45	29.31	47.76	
Alt 4 - Option 6	22.49	42.84	65.33	
Alt 2 - Option 7	18.30	29.31	47.61	

unmitigated

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B-2 Operational Emissions

Operational Emissions

Updated: 4/16/2018

Operational truck trips for material removal for 2A and 6
Operational excavator and backhoe operations for 2A and 6
Operational pump for alt 6

Emissions Summary

	Average Daily Emissions (lbs/day)				Maximum Annual Emissions (tons/year)				Total Emissions (MTCO2e)				
	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O	CO2e	
Nursery Site Detention Basin													
Off-Road Equipment	0.01	0.07	0.00	0.00	0.01	0.01	0.00	0.00	2.92	0.00	0.00	2.92	NOT USED - CalEEMod instead
On-Road Trucks	0.01	0.27	0.00	0.00	0.00	0.05	0.00	0.00	12.32	0.00	0.56	12.89	
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.43	
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.02	0.33	0.01	0.01	0.01	0.06	0.00	0.00	15.67	0.00	0.57	16.24	
Bridge Building #2 Demolition and Riparian Restoration													
Off-Road Equipment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NOT USED - CalEEMod instead
On-Road Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nursery Site Detention Basin - Option 6													
Off-Road Equipment	0.01	0.07	0.00	0.00	0.00	0.01	0.00	0.00	2.92	0.00	0.00	2.92	NOT USED - CalEEMod instead
On-Road Trucks	0.01	0.27	0.00	0.00	0.00	0.05	0.00	0.00	12.32	0.00	0.56	12.89	
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.43	
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.53	
Total	0.02	0.33	0.01	0.01	0.00	0.06	0.00	0.00	15.67	0.00	0.57	29.77	
Nursery Site Detention Basin - Option 7													
Off-Road Equipment	0.01	0.07	0.00	0.00	0.00	0.01	0.00	0.00	2.92	0.00	0.00	2.92	NOT USED - CalEEMod instead
On-Road Trucks	0.01	0.27	0.00	0.00	0.00	0.05	0.00	0.00	12.32	0.00	0.56	12.89	
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.43	
Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	0.02	0.33	0.01	0.01	0.00	0.06	0.00	0.00	15.67	0.00	0.57	16.24	

Truck Trips

Truck Operations

Daily Sediment (CY)	290	
Daily Truck Loads	33	
Truck Capacity (CY)	8.8	
Annual Sediment (CY)	1,600	
Annual Truck Loads	182	
Annual one-way trips	364	
Annual VMT	7,283	20-mile one-way trip to Redwood Landfill
Days of trucking	6	
Annual Idling hours	46	15 min idling per roundtrip
Onsite VMT		

PD Page 30:

Sediment may be removed at least annually from Fairfax Creek to maximize flood control effectiveness by maintaining the storage capacity in the channel. One routine, annual sediment removal would occur in the dry season to reduce effects on water quality and aquatic species. The amount of sediment removed in that routine maintenance action would vary depending on storm events and sediment moving into the creek each year. During especially wet years, a second sediment removal action may be necessary. This second removal could occur between large winter storms to restore detention capacity. The depth of sediment removal would be feathered in the up and downstream edges of the area to match the existing channel gradient. The removal would be done using a bulldozer in the creek and an excavator working from the maintenance access road, top of the diversion structure, or top of the side-weir, as needed to reach the deposited material. Up to 1,600 cubic yards of sediment may be removed from Fairfax Creek per sediment removal event. Removed sediment would be hauled to Redwood Landfill. Approximately 290 cubic yards, requiring 33 truckloads, would be generated each day during sediment removal; about one week would be required to remove 1,600 cubic yards of sediment.

Calculated EFs - Onsite Trucks tab

	ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
Running Emissions (g/mi)	0.219409436	5.791844	0.09337962	0.08934006	1652.954936	0.254775	77.42681
Idling Emissions (g/hr)	2.498328858	40.6292	0.06610876	0.06324892	6271.596817	0.116041	

	Average Daily Emissions (lbs/day)				Maximum Annual Emissions (tons/year)				Total Emissions (MTCO2e)			
	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O	CO2e
Nursery Site Detention Basin	0.01	0.27	0.00	0.00	0.002	0.049	0.001	0.001	12.32	0.00	0.56	12.89
Bridge Building #2 Demolition and Riparian R	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00
Nursery Site Detention Basin - Option 6	*0.01*	*0.27*	*0.00*	*0.00*	*0.002*	*0.049*	*0.001*	*0.001*	*12.32*	*0.00*	*0.56*	*12.89*
Nursery Site Detention Basin - Option 7	*0.01*	*0.27*	*0.00*	*0.00*	*0.002*	*0.049*	*0.001*	*0.001*	*12.32*	*0.00*	*0.56*	*12.89*

Off-Road Equipment - NOT USED

Excavator Operations

hrs/day	10
days	6
total hours	60

Emission Factors

					Emission Factors (g/hp-hr) - Unmitigated						Emission Factors (g/hp-hr) - Mitigated Tier 4 Interim					
Equipment Type	CalEEMod Equip HP		HP Source	LF	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4
336 Excavator	Excavators	266	http://www.r	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152

*= EF * HP * LF * lbs/g * equip hrs*

	Average Daily Emissions (lbs/day)				Maximum Annual Emissions (tons/year)				Total Emissions (MTCO2e)			
	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O	CO2e
Nursery Site Detention Basin	0.006	0.065	0.002	0.002	0.001	0.012	0.000	0.000	2.92	0.0009	0.0001	2.92
Bridge Building #2 Demolition and Riparian R	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0000	0.0000	0.00
Nursery Site Detention Basin - Option 6	*0.006*	*0.065*	*0.002*	*0.002*	*0.001*	*0.012*	*0.000*	*0.000*	*2.92*	*0.0009*	*0.0001*	*2.92*
Nursery Site Detention Basin - Option 7	*0.006*	*0.065*	*0.002*	*0.002*	*0.001*	*0.012*	*0.000*	*0.000*	*2.92*	*0.0009*	*0.0001*	*2.92*
CalEEMod Comparison	0.006	0.065	0.002	0.002	0.001	0.012	0.000	0.000	0.000			
Here vs. CalEEMod	0%	0%	-1%	-2%	0%	0%	-1%	-2%	#DIV/0!			

Worker Trips

Workers/day	10	conservative assumption
One-way trips/day	20	
one-way trip distance	10.8	CalEEMod default
days	6	
Total annual VMT	1296	

Calculated EFs (g/mi)

Vehicle Type	ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
Weighted Average	0.192195934	0.143548	0.04690031	0.01972737	327.6578282	0.420809	3.733709

see *WorkerCommute* tab

*= 20 one-way trips/day * 10.8 miles per one-way trip * 6 days * grams per mile / 365 days per year (convert to MT for GHGs*

	Average Daily Emissions (lbs/day)				Maximum Annual Emissions (tons/year)				Annual Emissions (MTCO2e)				
Site	ROG	NOX	PM10	PM2_5	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O	CO2e	
Nursery Site Detention Basin	0.0015	0.0011	0.0004	0.0002	0.000	0.000	0.000	0.000	0.42	0.0005	0.0048	0.43	
Bridge Building #2 Demolition and Riparian R	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.0000	0.0000	0.00	*no excavation / sediment removal*
Nursery Site Detention Basin - Option 6	0.0015	0.0011	0.0004	0.0002	0.000	0.000	0.000	0.000	0.42	0.0005	0.0048	0.43	
Nursery Site Detention Basin - Option 7	0.0015	0.0011	0.0004	0.0002	0.000	0.000	0.000	0.000	0.42	0.0005	0.0048	0.43	

Excavator Operations

Water Pump

This is ONLY for Nursery Site Option 6

Pump Operations

pump type	Flygt Vertical Pump: Model LL 3400	
pump HP	60	
pump kW	40	http://www.xylemwatersolutions.com/scs/denmark/da/produkter/avloppsvattenpumpar/pumpermedstortflow/Documents/vertical%20column%20pumps%20web.pdf
Efficiency	70%	
kWh per hour	57.14	
daily hours per event	24	
Annual events	50	Email from Dave Halsing on 4/4/18 says 2; but NOAA indicates 4 main storm periods for the 2016-2017 rainy season: https://www.cnrfc.noaa.gov/storm_summaries/janfeb2017storms.php. Assume 5 to be safe
annual hours	1200	
PG&E Emission Factor (lbs CO2e/MWh)	435	https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/fighting-climate-change/fighting-climate-change.page

Total Emissions (MTCO2e) **13.53**

Alts Section page 6-16:

The pump (approximately 10 horsepower; to be powered by electricity from the existing grid) would be installed to actively drain the sump and the basin prior to large storm events, shut down during events to reduce peak downstream flows, and then turn again after the peak discharge has passed. The discharge rate of the pumping system would need to be 1,170 gallons per minute in order to meet the design requirements; this is a rate that can be accommodated with a standard vertical turbine pump. The discharge pipe would empty into Fairfax Creek downstream of the diversion berm at the same point as the primary, passive gated outlet.

Flygt LL & NL 3000 capacities and sizes

Model	max. Capacity (at 60 Hz)	Head range	Motor 50Hz kW / rpm	Motor 60Hz hp / rpm	Discharge tube Ø mm /inch	Diffuser material	Propeller Material
NL 3102	70 l/s	1,5-7,5m	3,1 kW / 1440	5 hp / 1720	500 / 20"	Cast iron	Cast iron or SS
NL 3127	90 l/s	1,5-8,5m	7,5 kW / 1455	10 hp / 1735	600 / 24"	Cast iron	Cast iron or SS
LL 3152	240 l/s	1,5-6,5 m	8,8 kW / 955	14 hp / 1155	600 / 24"	Cast iron	Cast iron or SS
LL 3201	360 l/s	2- 9,5 m	22 kW / 970	30 hp / 855	800 / 32"	Cast iron	Cast iron or SS
LL 3300	540 l/s	3-15 m	37 kW / 725	60 hp / 870	800 / 32"	Cast iron	Cast iron or SS
NL 3300	520 l/s	3-23 m	27 kW / 725	60 hp / 875	800 / 32"	Cast iron	Cast iron or SS
NL 3300	520 l/s	3-23 m	44 kW / 975	75 hp / 1170	800 / 32"	Cast iron	Cast iron or SS
LL 3356	560 l/s	5-21 m	55 kW / 730	135 hp / 880	800 / 32"	Cast iron	Cast iron or SS
LL 3356	760 l/s	8-38 m	160 kW / 985	310 hp / 1185	800 / 32"	Cast iron	Cast iron or SS
LL 3400	600 l/s	3,5-8 m	40 kW / 490	60 hp / 505	900 / 36"	Cast iron	Cast iron or SS
LL 3400	700 l/s	4-11 m	70 kW / 585	110 hp / 590	900 / 36"	Cast iron	Cast iron or SS
LL 3400	840 l/s	5-16 m	140 kW / 730	150 hp / 705	900 / 36"	Cast iron	Cast iron or SS
LL 3400	1050 l/s	8-26 m		355 hp / 880	900 / 36"	Cast iron	Cast iron or SS
LL 3400	1200 l/s	10-30 m	375 kW / 985		900 / 36"	Cast iron	Cast iron or SS
LL 3602	1300 l/s	2-7 m	70 kW / 415		1200 / 48"	Cast iron	Cast iron or SS
LL 3602	1550 l/s	3-11 m	135 kW / 485	185 hp / 500	1200 / 48"	Cast iron	Cast iron or SS
LL 3602	1850 l/s	5-15 m	125 kW / 585	310 hp / 590	1200 / 48"	Cast iron	Cast iron or SS
LL 3602	2200 l/s	6-22 m	430 kW / 740	565 hp / 710	1200 / 48"	Cast iron	Cast iron or SS

B-3 Construction Schedule

Construction Schedule

Updated: 4/3/2018

NO OVERLAP BETWEEN PROJECTS; assume BB2 starts when nursery ends

Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS

Nursery Site Detention Basin — changes from original modeling

Item	Operation	Duration	Start Date	End Date	Workdays
1	Mobilization/Erosion Control	5	**1/1/2019**	1/7/2019	5
2	Demo Wood Framed Building	1	1/8/2019	1/8/2019	1
3	Demo Misc Structures	5	1/9/2019	1/15/2019	5
4	Clearing & Grubbing	3	1/16/2019	1/20/2019	3
5	Remove Trees	3	1/21/2019	1/23/2019	3
6	Remove septic tanks	1	1/24/2019	1/24/2019	1
7	Remove Fire Hydrant & Water Valve	1	1/25/2019	1/27/2019	1
8	Remove OH Electrical & Poles	2	1/28/2019	1/29/2019	2
9	Remove Fencing	1	1/30/2019	1/30/2019	1
10	Abandon Water Well	1	1/31/2019	1/31/2019	1
11	Top Soil Stripping/Stockpile	2	2/1/2019	2/4/2019	2
12	Excavation (Cut)	18	2/5/2019	2/28/2019	18
13	Over-excavation beneath berm	3	3/1/2019	3/5/2019	3
14	Over-excavation at spillway	3	3/6/2019	3/10/2019	3
15	Backfill Over-Excavated Areas	7	3/11/2019	3/19/2019	7
16	Off-Haul Trucks				0
17	Catch Basins, Manholes, Drainage Pi	15	3/20/2019	4/9/2019	15
18	Precast Box Culvert (6'x4' & 10'x5'),	8	4/10/2019	4/21/2019	8
19	Construct Overflow Weir/Floodwall	20	4/22/2019	5/19/2019	20
20	Pour Concrete Overflow Weir/Flood	3	5/20/2019	5/22/2019	3
21	Embankment (Berm)	6	5/23/2019	5/30/2019	6
22	Riprap	10	5/31/2019	6/13/2019	10
23	Riprap Trucks				0
24	Seepage cutoff wall 3' x 7'	13	1/2/1900	1/18/1900	13
25	Finish Grade Slopes/Seasonal Chann	2	1/19/1900	1/22/1900	2
26	Place Topsoil	1	1/23/1900	1/23/1900	1
27	Plantings	5	1/24/1900	1/30/1900	5
28	Hydroseeding	1	1/31/1900	1/31/1900	1
29	Fence	5	2/1/1900	2/7/1900	5
30	Demobilization	2	2/8/1900	2/9/1900	2
	Total	**147**	**1/1/2019**	**7/24/2019**	**147**
				Total Days	**204**
				Years	**0.56**

Bridge Building #2 Demolition and Riparian Restoration — changes from original modeling

Item	Operation	Duration	Start Date	End Date	Workdays
1	Mobilization/Erosion Control/Stream Diversion	5	**1/1/2019**	1/7/2019	5
2	Demo Wood Framed Building	2	1/8/2019	1/9/2019	2
3	Demo Concrete Structures	15	1/10/2019	1/30/2019	15
4	Clearing & Grubbing, Tree Removal	2	1/31/2019	2/3/2019	2
5	Top Soil Stripping/Stockpile	1	2/4/2019	2/4/2019	1
6	1/2 Ton Riprap. Slope Transition Structure	10	2/5/2019	2/18/2019	10
7	Terrace Flood Plain	2	2/19/2019	2/20/2019	2
8	Flood Walls	9	2/21/2019	3/5/2019	9
9	Storm Drain	1	3/6/2019	3/6/2019	1
10	Bioengineered Slope	14	3/7/2019	3/26/2019	14
11	Place Topsoil	1	3/27/2019	3/27/2019	1
12	Plantings	10	3/28/2019	4/10/2019	10
13	Guardrail	1	4/11/2019	4/11/2019	1
14	Demobilization	2	4/12/2019	4/15/2019	2
	Total	**75**	**1/1/2019**	**4/15/2019**	**75**
				Total Days	**104**
				Years	**0.28**

Alternative 4

Nursery Site Detention Basin - Option 6

Item	Operation	Duration	Start Date	End Date	Workdays
1	Mobilization/Erosion Control	5	**1/1/2019**	1/7/2019	5
2	Demo Wood Framed Building	1	1/8/2019	1/8/2019	1
3	Demo Misc Structures	5	1/9/2019	1/15/2019	5
4	Clearing & Grubbing	3	1/16/2019	1/20/2019	3
5	Remove Trees	3	1/21/2019	1/23/2019	3
6	Remove septic tanks	1	1/24/2019	1/24/2019	1
7	Remove Fire Hydrant & Water Valve	1	1/25/2019	1/27/2019	1
8	Remove OH Electrical & Poles	2	1/28/2019	1/29/2019	2
9	Remove Fencing	1	1/30/2019	1/30/2019	1
10	Abandon Water Well	1	1/31/2019	1/31/2019	1
11	Top Soil Stripping/Stockpile	2	2/1/2019	2/4/2019	2
12	Excavation (Cut)	23	2/5/2019	3/7/2019	23
13	Over-excavation beneath berm	3	3/8/2019	3/12/2019	3
14	Over-excvation at spillway	3	3/13/2019	3/17/2019	3
15	Backfill Over-Excavated Areas	7	3/18/2019	3/26/2019	7
16	Off-Haul Trucks				
17	Catch Basins, Manholes, Drainage Pi	15	3/27/2019	4/16/2019	15
18	Precast Box Culvert (6'x4' & 10'x5'),	8	4/17/2019	4/28/2019	8
19	Storm Water Lift Station	15	4/29/2019	5/19/2019	15
20	Construct Overflow Weir/Floodwall	20	5/20/2019	6/16/2019	20
21	Pour Concrete Overflow Weir/Flood	3	6/17/2019	6/19/2019	3
22	Embankment (Berm)	4	6/20/2019	6/25/2019	4
23	Riprap	10	6/26/2019	7/9/2019	10
24	Riprap Trucks				0
25	Seepage cutoff wall 3' x 7'	13	1/2/1900	1/18/1900	13
26	Finish Grade Slopes/Seasonal Chann	2	1/19/1900	1/22/1900	2
27	Place Topsoil	1	1/23/1900	1/23/1900	1
28	Plantings	5	1/24/1900	1/30/1900	5
29	Hydroseeding	1	1/31/1900	1/31/1900	1
30	Fence	5	2/1/1900	2/7/1900	5
31	Demobilization	2	2/8/1900	2/9/1900	2
	Total	**165**	**1/1/2019**	**8/19/2019**	**165**
				Total Days	**230**
				Years	**0.63**

Alternative 2

Nursery Site Detention Basin - Option 7

Item	Operation	Duration	Start Date	End Date	Workdays
1	Mobilization/Erosion Control	5	**1/1/2019**	1/7/2019	5
2	Demo Wood Framed Building	1	1/8/2019	1/8/2019	1
3	Demo Misc Structures	5	1/9/2019	1/15/2019	5
4	Clearing & Grubbing	2	1/16/2019	1/17/2019	2
5	Remove Trees	3	1/18/2019	1/22/2019	3
6	Remove septic tanks	1	1/23/2019	1/23/2019	1
7	Remove Fire Hydrant & Water Valve	1	1/24/2019	1/24/2019	1
8	Remove OH Electrical & Poles	2	1/25/2019	1/28/2019	2
9	Remove Fencing	1	1/29/2019	1/29/2019	1
10	Abandon Water Well	1	1/30/2019	1/30/2019	1
11	Top Soil Stripping/Stockpile	1	1/31/2019	1/31/2019	1
12	Excavation (Cut)	19	2/1/2019	2/27/2019	19
13	Over-excavation beneath berm	3	2/28/2019	3/4/2019	3
14	Backfill Over-Excavated Areas	4	3/5/2019	3/10/2019	4
15	Off-Haul Trucks				
16	Catch Basins, Manholes, Drainage Pi	15	3/11/2019	3/31/2019	15
17	Construct Overflow Weir/Floodwall	20	4/1/2019	4/28/2019	20

18	Pour Concrete Overflow Weir/Flood	3	4/29/2019	5/1/2019	3
19	Embankment (Berm)	1	5/2/2019	5/2/2019	1
20	Riprap	9	5/3/2019	5/15/2019	9
21	Riprap Trucks				0
22	Finish Grade Slopes/Seasonal Chann	2	5/16/2019	5/19/2019	2
23	Place Topsoil	1	5/20/2019	5/20/2019	1
24	Plantings	5	5/21/2019	5/27/2019	5
25	Hydroseeding	1	5/28/2019	5/28/2019	1
26	Fence	5	5/29/2019	6/4/2019	5
27	Demobilization	2	6/5/2019	6/6/2019	2
	Total	**113**	**1/1/2019**	**6/6/2019**	**113**
				Total Days	**156**
				Years	**0.43**

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B-4 Off-Road Construction Emissions

Off-road Construction Equipment Emissions
Updated: 4/12/2018

Summary Emissions

	Unmitigated Average Daily Emissions (lbs/day criteria, MTCO2/yr GHGs)								Mitigated Average Daily Emissions (lbs/day, MTCO2/yr GHGs) - Tier 4 Interim								Mitigated Average Daily Emissions (lbs/day, MTCO2/yr GHGs)) - Tier 4 Interim							
	ROG	NOX	Exhaust PM10	Exhaust PM2.5	CO2	CH4	N2O	CO2e	ROG	NOX	Exhaust PM10	:haust PM2	CO2	CH4	N2O	CO2e	ROG	NOX	Exhaust PM10	Exhaust PM2.5	CO2	CH4	N2O	CO2e
Nursery Site Detention Basin	1.045	11.282	0.485	0.452	118.617	0.035	0.003	120.395	0.318	6.310	0.068	0.068	118.617	0.035	0.003	120.395	0.318	6.310	0.068	0.068	118.617	0.035	0.003	120.395
Bridge Building #2 Demolition and Rip	0.586	5.685	0.280	0.262	37.521	0.011	0.001	38.076	0.221	4.139	0.065	0.065	37.521	0.011	0.001	38.076	0.221	4.139	0.065	0.065	37.521	0.011	0.001	38.076
Nursery Site Detention Basin - Option	1.085	11.443	0.500	0.467	139.026	0.040	0.004	141.089	0.341	6.656	0.079	0.079	139.026	0.040	0.004	141.089	0.341	6.656	0.079	0.079	139.026	0.040	0.004	141.089
Nursery Site Detention Basin - Option	0.934	9.845	0.430	0.403	80.000	0.023	0.002	81.177	0.293	5.544	0.073	0.073	80.000	0.023	0.002	81.177	0.293	5.544	0.073	0.073	80.000	0.023	0.002	81.177

No renewable diesel included

	For HRA - Total Annual PM (lbs)								
Pollutant	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Jnmitigate	Nursery7 Mitigated	
PM10 - DPM	71.2657	9.9231	21.0130	4.9078	82.4391	13.0792	48.5678	8.2709	
PM2.5	66.4262	9.9231	19.6760	4.9078	77.0959	13.0792	45.5334	8.2709	
		9.0198		4.5751		11.9034		7.5130	<old mitigated with gens and plate compactors tier 4

Emission Factors

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
					Emission Factors (g/hp-hr) - Unmitigated						Emission Factors (g/hp-hr) - Mitigated Tier 4 Interim						Mitigated EFs percent reduction					
Equipment Type	CalEEMod Equipment	HP	HP Source	LF	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4
450 Backhoe	Tractors/Loaders/Backhoes	137	http://www.ritch	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	-78%	-23%	-94%	-94%	0%	0%
966 Wheel Loader	Tractors/Loaders/Backhoes	170	http://www.ritch	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	-78%	-23%	-94%	-94%	0%	0%
336 Excavator	Excavators	266	http://www.ritch	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152	-51%	-28%	-86%	-85%	0%	0%
Air Compressor	Air Compressor	63	http://www.sulla	0.48	0.538	3.706	0.26	0.26	568.299	0.048	0.12	2.74	0.112	0.112	568.299	0.048	-78%	-26%	-57%	-57%	0%	0%
963 Track Loader	Tractors/Loaders/Backhoes	150	http://www.ritch	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	-78%	-23%	-94%	-94%	0%	0%
Skidsteer Loader	Skid Steer Loader	65	CalEEMod defaul	0.37	0.199	2.65586	0.122	0.112	482.3844	0.153	0.12	2.74	0.112	0.112	482.3844	0.153	-40%	3%	-8%	0%	0%	0%
CP433 Compactor	Other Construction Equipment	105	http://www.ritch	0.42	0.55	5.04831	0.379	0.349	482.2177	0.153	0.11	2.14	0.008	0.008	482.2177	0.153	-80%	-58%	-98%	-98%	0%	0%
Plate Compactor	Plate Compactors	8	CalEEMod defaul	0.43	0.661	4.142	0.161	0.161	568.299	0.059	0.661	4.142	0.161	0.161	568.299	0.059	0%	0%	0%	0%	0%	0%
5kW Generator	Generator Sets	10	5k*7HP	0.74	0.662	4.617	0.224	0.224	568.299	0.059	0.662	4.617	0.224	0.224	568.299	0.059	0%	0%	0%	0%	0%	0%
D6 Dozer	Crawler Tractors	245	http://www.cat.c	0.43	0.38	4.9721	0.187	0.172	483.4489	0.153	0.08	1.29	0.008	0.008	483.4489	0.153	-79%	-74%	-96%	-95%	0%	0%
140M Grader	Graders	213	http://www.cat.c	0.41	0.36	4.86575	0.156	0.144	486.3288	0.154	0.08	1.29	0.008	0.008	486.3288	0.154	-78%	-73%	-95%	-94%	0%	0%
CP64 Compactor	Other Construction Equipment	156	http://www.cat.c	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	-85%	-52%	-97%	-96%	0%	0%
Hydroseeder	Other Construction Equipment	125	http://www.finn	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	-85%	-52%	-97%	-96%	0%	0%

CalEEMod Emission Factors

Equipment Type	Year	Low HP	High HP	TOG	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4
Air Compressors	2019	6	15	1.951	0.748	3.562	4.647	0.008	0.241	0.241	568.299	0.067
Air Compressors	2019	16	25	4.106	0.787	2.501	4.596	0.007	0.222	0.222	568.299	0.071
Air Compressors	2019	26	50	9.076	1.129	5.283	4.546	0.007	0.287	0.287	568.299	0.101
Air Compressors	2019	51	120	9.123	0.538	3.718	3.706	0.006	0.26	0.26	568.299	0.048
Air Compressors	2019	121	175	12.833	0.401	3.204	2.874	0.006	0.15	0.15	568.299	0.036
Air Compressors	2019	176	250	14.416	0.304	1.132	2.469	0.006	0.078	0.078	568.299	0.027
Air Compressors	2019	251	500	24.559	0.293	1.086	2.193	0.005	0.075	0.075	568.299	0.026
Air Compressors	2019	501	750	38.104	0.294	1.086	2.247	0.005	0.076	0.076	568.299	0.026
Air Compressors	2019	751	1000	56.984	0.324	1.182	4.073	0.005	0.102	0.102	568.299	0.029
Crawler Tractors	2019	26	50	2.648469	2.225	7.58896	5.85476	0.005	0.64	0.589	525.9767	0.166
Crawler Tractors	2019	51	120	0.901167	0.757	4.08842	6.39347	0.005	0.535	0.492	486.9909	0.154
Crawler Tractors	2019	121	175	0.615173	0.517	3.37886	5.38191	0.005	0.3	0.276	481.6222	0.152
Crawler Tractors	2019	176	250	0.45175	0.38	1.60445	4.9721	0.005	0.187	0.172	483.4489	0.153
Crawler Tractors	2019	251	500	0.37933	0.319	2.21938	3.93412	0.005	0.153	0.141	485.8645	0.154
Crawler Tractors	2019	501	750	0.316919	0.266	1.35585	3.34253	0.005	0.123	0.113	483.3879	0.153
Crawler Tractors	2019	751	1000	0.547243	0.46	2.02037	7.21215	0.005	0.211	0.194	486.2545	0.154
Excavators	2019	16	25	0.75855	0.637	4.59698	4.19867	0.005	0.25	0.23	536.9132	0.17
Excavators	2019	26	50	0.75855	0.637	4.59698	4.19867	0.005	0.25	0.23	536.9132	0.17
Excavators	2019	51	120	0.386598	0.325	3.52421	3.36874	0.005	0.211	0.194	478.2452	0.151
Excavators	2019	121	175	0.293021	0.246	3.08163	2.53264	0.005	0.122	0.112	482.6838	0.153
Excavators	2019	176	250	0.220917	0.186	1.12671	2.24187	0.005	0.068	0.063	482.2503	0.153
Excavators	2019	251	500	0.192898	0.162	1.1135	1.77986	0.005	0.058	0.053	481.2361	0.152
Excavators	2019	501	750	0.209677	0.176	1.37289	1.98661	0.005	0.067	0.062	479.2876	0.152
Generator Sets	2019	6	15	1.758	0.662	3.562	4.617	0.008	0.224	0.224	568.299	0.059
Generator Sets	2019	16	25	3.356	0.731	2.501	4.596	0.007	0.214	0.214	568.299	0.066
Generator Sets	2019	26	50	6.208	0.779	4.076	4.215	0.007	0.222	0.222	568.299	0.07
Generator Sets	2019	51	120	8.233	0.405	3.396	3.446	0.006	0.206	0.206	568.299	0.036
Generator Sets	2019	121	175	10.727	0.29	2.929	2.669	0.006	0.118	0.118	568.299	0.026
Generator Sets	2019	176	250	11.695	0.211	1.036	2.285	0.006	0.064	0.064	568.299	0.019
Generator Sets	2019	251	500	17.492	0.199	1.015	2.056	0.005	0.062	0.062	568.299	0.018
Generator Sets	2019	501	750	28.675	0.202	1.015	2.104	0.005	0.062	0.062	568.299	0.018
Generator Sets	2019	1001	9999	71.228	0.261	1.103	3.829	0.005	0.087	0.087	568.299	0.023
Graders	2019	26	50	3.11378	2.616	8.27912	5.94463	0.005	0.737	0.678	503.7509	0.159
Graders	2019	51	120	1.228249	1.032	4.6424	8.1592	0.005	0.665	0.612	479.9011	0.152
Graders	2019	121	175	0.724541	0.609	3.65586	6.01354	0.005	0.337	0.31	489.0419	0.155
Graders	2019	176	250	0.428358	0.36	1.35927	4.86575	0.005	0.156	0.144	486.3288	0.154
Graders	2019	251	500	0.384059	0.323	1.52849	3.21794	0.005	0.124	0.114	482.5879	0.153
Graders	2019	501	750	13.635	0.335	1.255	2.276	0.005	0.08	0.08	568.299	0.03
Other Construction Equipment	2019	6	15	1.370834	1.152	5.54123	5.20338	0.005	0.437	0.402	539.7349	0.171
Other Construction Equipment	2019	16	25	1.370834	1.152	5.54123	5.20338	0.005	0.437	0.402	539.7349	0.171
Other Construction Equipment	2019	26	50	1.370834	1.152	5.54123	5.20338	0.005	0.437	0.402	539.7349	0.171
Other Construction Equipment	2019	51	120	0.655004	0.55	3.7535	5.04831	0.005	0.379	0.349	482.2177	0.153
Other Construction Equipment	2019	121	175	0.490382	0.412	3.25619	4.4331	0.005	0.233	0.215	480.4518	0.152
Other Construction Equipment	2019	251	500	0.277883	0.233	1.66739	2.85547	0.005	0.103	0.094	485.4127	0.154
Plate Compactors	2019	6	15	0.79	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059
Skid Steer Loaders	2019	16	25	0.531282	0.446	3.73957	3.75009	0.005	0.154	0.141	539.2667	0.171
Skid Steer Loaders	2019	26	50	0.531282	0.446	3.73957	3.75009	0.005	0.154	0.141	539.2667	0.171
Skid Steer Loaders	2019	51	120	0.2373	0.199	3.27736	2.65586	0.005	0.122	0.112	482.3844	0.153
Tractors/Loaders/Backhoes	2019	16	25	1.095082	0.92	5.20327	4.60928	0.005	0.33	0.304	527.6843	0.167
Tractors/Loaders/Backhoes	2019	26	50	1.095082	0.92	5.20327	4.60928	0.005	0.33	0.304	527.6843	0.167
Tractors/Loaders/Backhoes	2019	51	120	0.437701	0.368	3.63777	3.69257	0.005	0.247	0.227	485.8548	0.154
Tractors/Loaders/Backhoes	2019	121	175	0.321856	0.27	3.12158	2.78412	0.005	0.14	0.129	477.9151	0.151
Tractors/Loaders/Backhoes	2019	176	250	0.291458	0.245	1.22027	3.14683	0.005	0.102	0.094	481.4206	0.152
Tractors/Loaders/Backhoes	2019	251	500	0.245176	0.206	1.38918	2.34458	0.005	0.082	0.075	479.0826	0.152
Tractors/Loaders/Backhoes	2019	501	750	0.311873	0.262	1.6025	3.12046	0.005	0.117	0.107	478.9216	0.152

Tier	Low HP	High HP	CO,g/bhp-hr	NOx,g/bhp-hr	PM10,g/bhp-hr	PM2.5,g/bhp-hr	ROG,g/bhp-hr
Tier 1	25	49	4.1	5.26	0.48	0.48	1.74
Tier 1	50	74	6.9	6.54	0.552	0.552	1.19
Tier 1	75	119	6.9	6.54	0.552	0.552	1.19
Tier 1	120	174	6.9	6.54	0.274	0.274	0.82
Tier 1	175	299	6.9	5.93	0.108	0.108	0.38
Tier 1	300	599	6.9	5.93	0.108	0.108	0.38
Tier 1	600	750	6.9	5.93	0.108	0.108	0.38
Tier 1	751	2000	6.9	5.93	0.108	0.108	0.38
Tier 2	25	49	4.1	4.63	0.28	0.28	0.29
Tier 2	50	74	3.7	4.75	0.192	0.192	0.23
Tier 2	75	119	3.7	4.75	0.192	0.192	0.23
Tier 2	120	174	3.7	4.17	0.128	0.128	0.19
Tier 2	175	299	2.6	4.15	0.088	0.088	0.12
Tier 2	300	599	2.6	3.79	0.088	0.088	0.12
Tier 2	600	750	2.6	3.79	0.088	0.088	0.12
Tier 2	751	2000	2.6	3.79	0.088	0.088	0.12
Tier 3	25	49	4.1	4.63	0.28	0.28	0.29
Tier 3	50	74	3.7	2.74	0.192	0.192	0.12
Tier 3	75	119	3.7	2.74	0.192	0.192	0.12
Tier 3	120	174	3.7	2.32	0.112	0.112	0.12
Tier 3	175	299	2.6	2.32	0.088	0.088	0.12
Tier 3	300	599	2.6	2.32	0.088	0.088	0.12
Tier 3	600	750	2.6	2.32	0.088	0.088	0.12
Tier 3	751	2000	2.6	2.32	0.088	0.088	0.12
Tier 4 Interim	25	49	4.1	4.55	0.128	0.128	0.12
Tier 4 Interim	50	74	3.7	2.74	0.112	0.112	0.12
Tier 4 Interim	75	119	3.7	2.14	0.008	0.008	0.11
Tier 4 Interim	120	174	3.7	2.15	0.008	0.008	0.06
Tier 4 Interim	175	299	2.6	1.29	0.008	0.008	0.08
Tier 4 Interim	300	599	2.6	1.29	0.008	0.008	0.08
Tier 4 Interim	600	750	2.6	1.29	0.008	0.008	0.08
Tier 4 Interim	751	2000	2.6	2.24	0.048	0.048	0.12
Tier 4 Final	25	49	4.1	2.75	0.008	0.008	0.12
Tier 4 Final	50	74	3.7	2.74	0.008	0.008	0.12
Tier 4 Final	75	119	3.7	0.26	0.008	0.008	0.06
Tier 4 Final	120	174	3.7	0.26	0.008	0.008	0.06
Tier 4 Final	175	299	2.2	0.26	0.008	0.008	0.06
Tier 4 Final	300	599	2.2	0.26	0.008	0.008	0.06
Tier 4 Final	600	750	2.2	0.26	0.008	0.008	0.06
Tier 4 Final	751	2000	2.6	2.24	0.016	0.016	0.06

Source: Offroad_Efs

Emissions by Site / Alternative

							Emission Factors (g/hp-hr) - Unmitigated						Emission Factors (g/hp-hr) - Mitigated Tier 4 Interim						= EF * HP * LF * lbs/g * equip hrs Emissions (lbs) - Unmitigated						Emissions (lbs) - Mitigated					
Equipment Recap	Hrs/day	Days	Equip Hrs	Equipment Type	HP	LF	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4	ROG	NOX	PM10	PM2.5	CO2	CH4
Bridge Building #2 Demolition and Riparian Restoration			5,581		1,588																									
Pickup Trucks Superintendent, Forema	10	225	2250																											
450 Backhoe: Items 1, 14	8	7	56	450 Backhoe	137	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	1.689696467	17.42339899	0.876139	0.807299	2990.857	0.944978	0.375488	13.45499	0.050065	0.050065	2990.857	0.944978
Flatbed Truck: Items 1-5, 8, 9, 12-14	8	48	384																											
966 Wheel Loader: Item 2	8	2	16	966 Wheel Loader	170	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	0.599058184	6.17722175	0.310623	0.286217	1060.366	0.335029	0.133124	4.770278	0.01775	0.01775	1060.366	0.335029
336 Excavator: Items 2, 3, 4, 6, 7 & 9	8	51	404	336 Excavator	266	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152	14.58465722	160.238568	5.221667	4.771524	43325.08	13.68437	7.2023	116.1371	0.72023	0.72023	43325.08	13.68437
End Dump/Highside: Items 2-4, 6, 10	8	122	976																											
Watertruck: Items 2, 3, 4, 5, 6, 8, 10	8	47	376																											
Air Compressor: Items 2, 3, 8, 13	8	27	216	Air Compressor	63	0.48	0.538	3.706	0.26	0.26	568.299	0.048	0.12	2.74	0.112	0.112	568.299	0.048	7.747336637	53.36734122	3.744066	3.744066	8183.65	0.691212	1.72803	39.4567	1.612828	1.612828	8183.65	0.691212
963 Track Loader: Items 3, 4, 6 & 9	8	28	224	963 Track Loader	150	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	7.400130514	76.30685691	3.837105	3.535618	13098.64	4.138592	1.644473	58.92697	0.219263	0.219263	13098.64	4.138592
Skidsteer Loader: Items 5, 7, 10, 11, 12	8	28	224	Skidsteer Loader	65	0.37	0.199	2.65586	0.122	0.112	482.3844	0.153	0.12	2.74	0.112	0.112	482.3844	0.153	2.363473783	31.54299236	1.448964	1.330196	5729.16	1.817143	1.42521	32.5423	1.330196	1.330196	5729.16	1.817143
CP433 Compactor: Items 7, 10	8	16	128	CP433 Compactor	105	0.42	0.55	5.04831	0.379	0.349	482.2177	0.153	0.11	2.14	0.008	0.008	482.2177	0.153	6.84456516	62.82452135	4.716528	4.343188	6001.037	1.904034	1.368913	26.63158	0.099557	0.099557	6001.037	1.904034
Plate Compactor: Items 7, 10	8	16	128	Plate Compactor	8	0.43	0.661	4.142	0.161	0.161	568.299	0.059	0.661	4.142	0.161	0.161	568.299	0.059	0.641659289	4.020806011	0.156289	0.156289	551.6707	0.057274	0.641659	4.020806	0.156289	0.156289	551.6707	0.057274
5kW Generator: Items 8, 10, 13	8	24	192	5kW Generator	10	0.74	0.662	4.617	0.224	0.224	568.299	0.059	0.662	4.617	0.224	0.224	568.299	0.059	2.073602709	14.46196935	0.701642	0.701642	1780.1	0.184807	2.073603	14.46197	0.701642	0.701642	1780.1	0.184807
Ready Mix Truck	8	1	7																											
Nursery Site Detention Basin			10,820		4,000																									
Pickup Trucks Superintendent, Forema	10	441	4410																											
450 Backhoe: Items 1, 10, 27, 29, 30	10	18	180	450 Backhoe	137	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	5.431167216	56.00378248	2.816161	2.594891	9613.47	3.037431	1.206926	43.24818	0.160923	0.160923	9613.47	3.037431
Flatbed Truck: Items 1-15, 19-22, 24, 2	10	120	1200																											
966 Wheel Loader: Item 2-7, 11-18, 21	10	100	1000	966 Wheel Loader	170	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	37.44113653	386.0763594	19.41392	17.88854	66272.91	20.9393	8.320253	298.1424	1.109367	1.109367	66272.91	20.9393
336 Excavator: Items 2-7, 12-14, 17, 18	10	84	840	336 Excavator	266	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152	30.32453482	333.1692997	10.85693	9.92099	90081.86	28.45265	14.97508	241.4731	1.497508	1.497508	90081.86	28.45265
D6 Dozer: Items 11- 15, 21, 25	10	41	410	D6 Dozer	245	0.43	0.38	4.9721	0.187	0.172	483.4489	0.153	0.08	1.29	0.008	0.008	483.4489	0.153	36.18566906	473.4704346	17.80716	16.37878	46036.64	14.56949	7.618036	122.8408	0.761804	0.761804	46036.64	14.56949
140M Grader: Items 15, 21, 25, 26	10	16	160	140M Grader	213	0.41	0.36	4.86575	0.156	0.144	486.3288	0.154	0.08	1.29	0.008	0.008	486.3288	0.154	11.0897194	149.8883393	4.805545	4.435888	14981.25	4.743936	2.464382	39.73816	0.246438	0.246438	14981.25	4.743936
End Dump/Highside: Items 2-7	10	14	140																											
Watertruck: Items 11-18, 21, 25, 26, 2	10	66	660																											
Air Compressor: Items 1, 2, 8, 9, 17-20	10	50	500	Air Compressor	63	0.48	0.538	3.706	0.26	0.26	568.299	0.048	0.12	2.74	0.112	0.112	568.299	0.048	17.93364962	123.5355121	8.66682	8.66682	18943.63	1.600028	4.000071	91.33494	3.733399	3.733399	18943.63	1.600028
CP64 Compactor: Items 15, 21	10	13	130	CP64 Compactor	156	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	7.736580892	83.24523484	4.375299	4.037293	9021.976	2.854273	1.126687	40.37293	0.150225	0.150225	9021.976	2.854273
Plate Compactor: Items 17, 18	10	23	230	Plate Compactor	8	0.43	0.661	4.142	0.161	0.161	568.299	0.059	0.661	4.142	0.161	0.161	568.299	0.059	1.152981534	7.2248858	0.280832	0.280832	991.2833	0.102914	1.152982	7.224886	0.280832	0.280832	991.2833	0.102914
5kW Generator: Items 8, 9, 17-20, 29	10	54	540	5kW Generator	10	0.74	0.662	4.617	0.224	0.224	568.299	0.059	0.662	4.617	0.224	0.224	568.299	0.059	5.832007619	40.67428979	1.973368	1.973368	5006.532	0.519771	5.832008	40.67429	1.973368	1.973368	5006.532	0.519771
Hydroseeder: item 28	10	1	10	Hydroseeder	125	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	0.476860262	5.130993271	0.269681	0.248847	556.0883	0.175929	0.069446	2.48847	0.009259	0.009259	556.0883	0.175929
Ready Mix Truck: Item 20, 24	10	16	160																											
Boom Truck: Item 8, 19, 20	10	25	250																											
Nursery Site Detention Basin - Option 6			12,490		4,920																									
Pickup Trucks Superintendent, Forema	10	495	4950																											
450 Backhoe: Items 1, 10, 28, 30, 31	10	18	180	450 Backhoe	137	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	5.431167216	56.00378248	2.816161	2.594891	9613.47	3.037431	1.206926	43.24818	0.160923	0.160923	9613.47	3.037431
Flatbed Truck: Items 1-15, 20-25, 28, 3	10	123	1230																											
966 Wheel Loader: Item 2-7, 11-19, 22	10	118	1180	966 Wheel Loader	170	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	44.1805411	455.5701041	22.90843	21.10848	78202.03	24.70838	9.817898	351.808	1.309053	1.309053	78202.03	24.70838
336 Excavator: Items 2-7, 12-14, 17-19	10	104	1040	336 Excavator	266	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152	37.54466216	412.4953234	13.44192	12.28313	111529.9	35.22709	18.54057	298.9668	1.854057	1.854057	111529.9	35.22709
D6 Dozer: Items 11-15, 22, 26	10	44	440	D6 Dozer	245	0.43	0.38	4.9721	0.187	0.172	483.4489	0.153	0.08	1.29	0.008	0.008	483.4489	0.153	38.83340094	508.1146127	19.11012	17.57722	49405.17	15.63555	8.175453	131.8292	0.817545	0.817545	49405.17	15.63555
140M Grader: Items 15, 22, 26, 27	10	14	140	140M Grader	213	0.41	0.36	4.86575	0.156	0.144	486.3288	0.154	0.08	1.29	0.008	0.008	486.3288	0.154	9.703504471	131.1522969	4.204852	3.881402	13108.59	4.150944	2.156334	34.77089	0.215633	0.215633	13108.59	4.150944
End Dump/Highside: Items 2-7	10	14	140																											
Watertruck: Items 11-19, 22, 26, 27, 2	10	84	840																											
Air Compressor: Items 2, 3, 8, 9, 17-21	10	75	750	Air Compressor	63	0.48	0.538	3.706	0.26	0.26	568.299	0.048	0.12	2.74	0.112	0.112	568.299	0.048	26.90047444	185.3032681	13.00023	13.00023	28415.45	2.400042	6.000106	137.0024	5.600099	5.600099	28415.45	2.400042
CP64 Compactor: Items 15, 22	10	11	110	CP64 Compactor	156	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	6.546337678	70.43827563	3.702176	3.416171	7633.98	2.415154	0.95335	34.16171	0.127113	0.127113	7633.98	2.415154
Plate Compactor: Items 17-19	10	38	380	Plate Compactor	8	0.43	0.661	4.142	0.161	0.161	568.299	0.059	0.661	4.142	0.161	0.161	568.299	0.059	1.904926013	11.93676784	0.463983	0.463983	1637.772	0.170031	1.904926	11.93677	0.463983	0.463983	1637.772	0.170031
5kW Generator: Items 8, 9, 17-21, 30	10	69	690	5kW Generator	10	0.74	0.662	4.617	0.224	0.224	568.299	0.059	0.662	4.617	0.224	0.224	568.299	0.059	7.452009736	51.97270234	2.521526	2.521526	6397.235	0.664152	7.45201	51.9727	2.521526	2.521526	6397.235	0.664152
Hydroseeder: item 29	10	1	10	Hydroseeder	125	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	0.476860262	5.130993271	0.269681	0.248847	556.0883	0.175929	0.069446	2.48847	0.009259	0.009259	556.0883	0.175929
Ready Mix Truck: Item 21, 25	10	16	160																											
Boom Truck: Item 8, 20, 21	10	25	250																											
Nursery Site Detention Basin - Option 7			8,030		2,850																									
Pickup Trucks Superintendent, Forema	10	339	3390																											
450 Backhoe: Items 1, 9, 10, 23, 25, 26	10	19	190	450 Backhoe	137	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	5.732898728	59.11510373	2.972614	2.739052	10147.55	3.206177	1.273977	45.65086	0.169864	0.169864	10147.55	3.206177
Flatbed Truck: Items 1-14, 17-20, 23, 2	10	94	940																											
966 Wheel Loader: Item 2-7, 11, 12, 16	10	50	500	966 Wheel Loader	170	0.37	0.27	2.78412	0.14	0.129	477.9151	0.151	0.06	2.15	0.008	0.008	477.9151	0.151	18.72056826	193.0381797	9.706961	8.944272	33136.45	10.46965	4.160126	149.0712	0.554684	0.554684	33136.45	10.46965
336 Excavator: Items 2-7, 12, 13, 16, 2	10	59	590	336 Excavator	266	0.38	0.162	1.77986	0.058	0.053	481.2361	0.152	0.08	1.29	0.008	0.008	481.2361	0.152	21.29937565	234.01177	7.625702	6.968314	63271.78	19.9846	10.51821	169.6061	1.051821	1.051821	63271.78	19.9846
D6 Dozer: Items 11-14, 17, 18	10	30	300	D6 Dozer	245	0.43	0.38	4.9721	0.187	0.172	483.4489	0.153	0.08	1.29	0.008	0.008	483.4489	0.153	26.47731882	346.4417814	13.02963	11.98447	33685.34	10.6606	5.574172	89.88353	0.557417	0.557417	33685.34	10.6606
140M Grader: Items 14, 19, 21,22	10	8	80	140M Grader	213	0.41	0.36	4.86575	0.156	0.144	486.3288	0.154	0.08	1.29	0.008	0.008	486.3288	0.154	5.544859698	74.94416965	2.402773	2.217944	7490.625	2.371968	1.232191	19.86908	0.123219	0.123219	7490.625	2.371968
End Dump/Highside: Items 2-7	10	13	130																											
Watertruck: Items 11-14, 16, 19, 21, 2	10	47	470																											
Air Compressor: Items 2, 3, 8, 9, 16-18	10	52	520	Air Compressor	63	0.48	0.538	3.706	0.26	0.26	568.299	0.048	0.12	2.74	0.112	0.112	568.299	0.048	18.65099561	128.4769326	9.013492	9.013492	19701.38	1.664029	4.160073	94.98834	3.882735	3.882735	19701.38	1.664029
CP64 Compactor: Items 14, 19	10	5	50	CP64 Compactor	156	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	2.975608035	32.01739801	1.682807	1.552805	3469.991	1.097797	0.433341	15.52805	0.057779	0.057779	3469.991	1.097797
Plate Compactor: Items 16	10	15	150	Plate Compactor	8	0.43	0.661	4.142	0.161	0.161	568.299	0.059	0.661	4.142	0.161	0.161	568.299	0.059	0.751944479	4.711882044	0.183151	0.183151	646.4891	0.067118	0.751944	4.711882	0.183151	0.183151	646.4891	0.067118
5kW Generator: Items 8, 9, 16-18, 25	10	46	460	5kW Generator	10	0.74	0.662	4.617	0.224	0.224	568.299	0.059	0.662	4.617	0.224	0.224	568.299	0.059	4.96800649	34.64846823	1.681017	1.681017	4264.823	0.442768	4.968006	34.64847	1.681017	1.681017	4264.823	0.442768
Hydroseeder: item 25	10	1	10	Hydroseeder	125	0.42	0.412	4.4331	0.233	0.215	480.4518	0.152	0.06	2.15	0.008	0.008	480.4518	0.152	0.476860262	5.130993271	0.269681	0.248847	556.0883	0.175929	0.069446	2.48847	0.009259	0.009259	556.0883	0.175929
Boom Truck: Item 8, 17, 18	10	25	250																											

Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS

B-5 Worker Commutes

Worker Commute Emissions

Updated: 4/4/2018

Calculated using EMFAC2017 EFs for LDA, LDT1, LDT2 (CalEEMod "LD_Mix")

Assumptions

Workers/day	30	PD says 20-30 workers/day
One-way trips/day	60	
Trip length (one-way)	10.8	CalEEMod default
Vehicle Types:		
LDA	50%	CalEEMod Appendix 2: 50% light-duty auto (or passenger car), 25% light-duty truck type 1 (LDT1), and 25% light-duty truck type 2 (LDT2)
LDT1	25%	
LDT2	25%	

EMFAC2017 Emission Factors

Total Emissions by Aggregated Speed Emissions = tons/day; Fuel = 1000 gallons/day

calendar_year	season_mc	sub_area	vehicle_cla	fuel	pollutant	emission
2019	Annual	Marin (SF)	LDA	Gas	NOx	0.494985
2019	Annual	Marin (SF)	LDA	Gas	PM10	0.220537
2019	Annual	Marin (SF)	LDA	Gas	PM2_5	0.0924
2019	Annual	Marin (SF)	LDA	Gas	ROG	0.65551
2019	Annual	Marin (SF)	LDT1	Gas	NOx	0.109347
2019	Annual	Marin (SF)	LDT1	Gas	PM10	0.025784
2019	Annual	Marin (SF)	LDT1	Gas	PM2_5	0.011013
2019	Annual	Marin (SF)	LDT1	Gas	ROG	0.16832
2019	Annual	Marin (SF)	LDT2	Gas	NOx	0.309677
2019	Annual	Marin (SF)	LDT2	Gas	PM10	0.088606
2019	Annual	Marin (SF)	LDT2	Gas	PM2_5	0.036974
2019	Annual	Marin (SF)	LDT2	Gas	ROG	0.343634
2019	Annual	Marin (SF)	LDA	Gas	CH4	1.679103
2019	Annual	Marin (SF)	LDA	Gas	CO2	1390.704
2019	Annual	Marin (SF)	LDA	Gas	N2O	14.79877
2019	Annual	Marin (SF)	LDT1	Gas	CH4	0.299203
2019	Annual	Marin (SF)	LDT1	Gas	CO2	186.4021
2019	Annual	Marin (SF)	LDT1	Gas	N2O	2.494028
2019	Annual	Marin (SF)	LDT2	Gas	CH4	0.798757
2019	Annual	Marin (SF)	LDT2	Gas	CO2	718.0189
2019	Annual	Marin (SF)	LDT2	Gas	N2O	7.730588

Default_Marin_2019_Annual_Worker_emission

Aggregated VMT

calendar_y	sub_area	vehicle_cla	fuel	vmt
2019	Marin (SF)	LDA	Gas	4279849
2019	Marin (SF)	LDT1	Gas	492237.3
2019	Marin (SF)	LDT2	Gas	1725363

Calculated EFs (g/mi)

Vehicle Type	Fuel	VMT	ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
LDA	Gas	4,279,849	0.138946	0.10492	0.0467464	0.019586	294.7828	0.3559138	3.136845
LDT1	Gas	492,237	0.310211	0.201525	0.0475201	0.020298	343.536	0.5514257	4.596451
LDT2	Gas	1,725,363	0.18068	0.162826	0.0465884	0.01944	377.5298	0.4199815	4.064694
Weighted Average			0.192196	0.143548	0.0469003	0.019727	327.6578	0.4208087	3.733709

Worker Trip Emissions

*= 60 one-way trips/day * 10.8 miles per one-way trip * grams per mile * lbs per gram*

	Average Daily Emissions (lbs/day)				Annual Emissions (MTCO2e)			
Site	**ROG**	**NOX**	**PM10**	**PM2_5**	**CO2**	**CH4**	**N2O**	**CO2e**
Nursery Site Detention Basin	0.2746	0.2051	0.0670	0.0282	31.21	0.04	0.36	31.61
Bridge Building #2 Demolition and Riparia	0.2746	0.2051	0.0670	0.0282	15.92	0.02	0.18	16.13
Nursery Site Detention Basin - Option 6	0.2746	0.2051	0.0670	0.0282	35.03	0.04	0.40	35.48
Nursery Site Detention Basin - Option 7	0.2746	0.2051	0.0670	0.0282	23.99	0.03	0.27	24.30

B-6 Construction Haul Truck Emissions

HD Trucks

Updated: 4/4/2018

Includes semi-highside, semi-end dumps, bottom dumps, water trucks, ready mix, and boom trucks. Flatbed (MDV) and pickup trucks (LDHT) not included.

Calculated using EMFAC2017 EFs for HHDT

Assumptions

Trip lengths (one-way) 20 From R6 spreadsheet: *Bottom dump trucks haul an average of 14.5 CY to Redwood Landfill in Petaluma. Flagging required at SFDB. Quantity = (Excavation - Embankment) + 20%*

Note: ~21 miles from Nursery to Redwoord ~18 miles from BB2 to Redwood, and 20 mile CalEEMod default. So use 20 for all trucks.

Summary of Emissions

	Total One-Way Trips	Total VMT	Average Daily Miles	Average Daily Emissions (lbs/day) ROG	NOX	PM10 Exh	PM2.5 Exh	Total Emissions (MTCO2e) CO2	CH4	N2O	CO2e
Nursery Site Detention Ba	6,808	136,160	926	0.4480	11.8272	0.1907	0.1824	225.07	0.03	10.54	235.64
Bridge Building #2 Demoli	1,474	29,480	393	0.1901	5.0190	0.0809	0.0774	48.73	0.01	2.28	51.02
Nursery Site Detention Ba	9,226	184,520	1,118	0.5409	14.2794	0.2302	0.2203	305.00	0.05	14.29	319.34
Nursery Site Detention Ba	7,950	159,000	1,407	0.6806	17.9668	0.2897	0.2771	262.82	0.04	12.31	275.17

For HRA - Total Annual PM (lbs)

Pollutant	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated
PM10 - DPM	28.0309	*28.0309*	11.8952	*11.8952*	33.8426	*33.8426*	42.5817	*42.5817*
PM2.5	26.8182	*26.8182*	11.3806	*11.3806*	32.3786	*32.3786*	40.7396	*40.7396*

Emission Factors

Calculated EFs (g/mi) - Onsite Trucks tab

ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
0.219409436	5.791843668	0.093379625	0.089340063	1652.955	0.254775	77.426806

HD Truck Trips

Green = CalEEMod Entry   CalEEMod NOT USED

Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS

Nursery Site Detention Basin

Item	Operation	Work Days	Daily round trips (loads)	Total One-way trips	rtps/day
1	Mobilization/Erosion Control	5	2	20	4
2	Demo Wood Framed Building	1	4	8	8
3	Demo Misc Structures	5	4	40	8
4	Clearing & Grubbing	3	2	12	4
5	Remove Trees	3	2	12	4
6	Remove septic tanks	1	2	4	4
7	Remove Fire Hydrant & Water	1	2	4	4
8	Remove OH Electrical & Poles	2	7	28	14
9	Remove Fencing	1	2	4	4
10	Abandon Water Well	1	2	4	4
11	Top Soil Stripping/Stockpile	2	12	48	24
12	Excavation (Cut)	18	12	432	24
13	Over-excavation beneath bern	3	12	72	24
14	Over-excavation at spillway	3	12	72	24
15	Backfill Over-Excavated Areas	7	12	168	24
16	Off-Haul Trucks	13.61	142	3,866	284
17	Catch Basins, Manholes, Drain	15	12	360	24
18	Precast Box Culvert (6'x4' & 1C	8	12	192	24
19	Construct Overflow Weir/Floo	20	7	280	14
20	Pour Concrete Overflow Weir/	3	12	72	24
21	Embankment (Berm)	6	12	144	24
22	Riprap	10	32	640	64
23	Riprap Trucks	0	0	0	0
24	Seepage cutoff wall 3' x 7'	13	7	182	14
25	Finish Grade Slopes/Seasonal	2	12	48	24
26	Place Topsoil	1	12	24	24
27	Plantings	5	2	20	4
28	Hydroseeding	1	12	24	24
29	Fence	5	2	20	4
30	Demobilization	2	2	8	4
	Total			**6,808**	
				0 HHDT rtps/day	
				0 Min	
				284 Max	

Bridge Building #2 Demolition and Riparian Restoration

Item	Operation	Work Days	Daily round trips (loads)	Total One-way trips	rtps/day
1	Mobilization/Erosion Cc	5	1	10	2
2	Demo Wood Framed Bu	2	8	32	16
3	Demo Concrete Structu	15	10	300	20
4	Clearing & Grubbing, Tr	2	8	32	16
5	Top Soil Stripping/Stock	1	6	12	12
6	1/2 Ton Riprap. Slope Tı	10	34	680	68
7	Terrace Flood Plain	2	6	24	12
8	Flood Walls	9	2	36	4
9	Storm Drain	1	6	12	12
10	Bioengineered Slope	14	11	308	22
11	Place Topsoil	1	1	2	2
12	Plantings	10	1	20	2
13	Guardrail	1	1	2	2
14	Demobilization	2	1	4	2
	Total			**1,474**	
				0 HHDT rtps/day	
				2 Min	
				68 Max	

Nursery Site Detention Basin - Option 6

Item	Operation	Work Days	Daily round trips (loads)	Total One-way trips	rtps/day
1	Mobilization/Erosion Control	5	2	22	4.339394
2	Demo Wood Framed Building	1	4	8	8.339394
3	Demo Misc Structures	5	4	42	8.339394
4	Clearing & Grubbing	3	4	25	8.339394
5	Remove Trees	3	4	25	8.339394
6	Remove septic tanks	1	2	4	4.339394
7	Remove Fire Hydrant & Water	1	2	4	4.339394
8	Remove OH Electrical & Poles	2	7	29	14.33939
9	Remove Fencing	1	2	4	4.339394
10	Abandon Water Well	1	2	4	4.339394
11	Top Soil Stripping/Stockpile	2	12	49	24.33939
12	Excavation (Cut)	23	12	560	24.33939
13	Over-excavation beneath bern	3	12	73	24.33939
14	Over-excvation at spillway	3	12	73	24.33939
15	Backfill Over-Excavated Areas	7	12	170	24.33939
16	Off-Haul Trucks	20.32	142	5,772	284
17	Catch Basins, Manholes, Drain	15	12	365	24.33939
18	Precast Box Culvert (6'x4' & 1C	8	12	195	24.33939
19	Storm Water Lift Station	15	12	365	24.33939
20	Construct Overflow Weir/Floo	20	7	287	14.33939
21	Pour Concrete Overflow Weir/	3	12	73	24.33939
22	Embankment (Berm)	4	12	97	24.33939
23	Riprap	10	32	643	64.33939
24	Riprap Trucks	0	0	0	0
25	Seepage cutoff wall 3' x 7'	13	7	186	14.33939
26	Finish Grade Slopes/Seasonal	2	12	49	24.33939
27	Place Topsoil	1	12	24	24.33939
28	Plantings	5	2	22	4.339394
29	Hydroseeding	1	12	24	24.33939
30	Fence	5	2	22	4.339394
31	Demobilization	2	2	9	4.339394
	Total			**9,226**	
	Source: XXX			0 HHDT rtps/day	
				0 Min	
				284 Max	

Nursery Site Detention Basin - Option 7

Item	Operation	Work Days	Daily round trips (loads)	Total One-way trips	rtps/day
1	Mobilization/Erosion Cc	5	3	30	6
2	Demo Wood Framed Bu	1	5	10	10
3	Demo Misc Structures	5	5	50	10
4	Clearing & Grubbing	2	5	20	10
5	Remove Trees	3	5	30	10
6	Remove septic tanks	1	3	6	6
7	Remove Fire Hydrant &	1	3	6	6
8	Remove OH Electrical &	2	8	32	16
9	Remove Fencing	1	3	6	6
10	Abandon Water Well	1	3	6	6
11	Top Soil Stripping/Stock	1	13	26	26
12	Excavation (Cut)	19	13	494	26
13	Over-excavation beneat	3	13	78	26
14	Backfill Over-Excavated	4	13	104	26
15	Off-Haul Trucks	19.42	142	5,516	284
16	Catch Basins, Manholes	15	13	390	26
17	Construct Overflow We	20	8	320	16
18	Pour Concrete Overflow	3	8	48	16
19	Embankment (Berm)	1	13	26	26
20	Riprap	9	32	576	64
21	Riprap Trucks	0	0	0	0
22	Finish Grade Slopes/Sea	2	13	52	26
23	Place Topsoil	1	13	26	26
24	Plantings	5	3	30	6
25	Hydroseeding	1	13	26	26
26	Fence	5	3	30	6
27	Demobilization	2	3	12	6
	Total			**7,950**	
	Source: XXX			0 HHDT rtps/day	
				0 Min	
				284 Max	

For CalEEMod Entry

	Nursery Site	BB2	Nursery Site - Option 6	Nursery Site - Option 7	
Worker Trips					
Total Trips (one-way)	8,820	4,500	9,900	6,780	
Daily Trips (one-way)	60	60	60	60	*PD: 20-30 crew per day*
Pickups					
Total Trips (one-way)	735	375	825	565	

Daily Trips (one-way)	5	5	5	5
Haul Truck Trips (includes water trucks)				
Total Trips (one-way)	6,808	1,474	9,226	7,950
Daily Trips (one-way)	46	20	56	70

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B-7 Construction Onsite Truck Emissions

Onsite Trucks and Idling + Pickup Truck loads

Updated: 4/12/2018

Includes all HD trucks (semi-highside, semi-end dumps, bottom dumps, water trucks, ready mix, boom trucks, misc trucks), MD trucks (flatbed), and pickup trucks

Assumptions

avg. speed traveling onsite (mph)	5	assumption
Time spend moving onsite	20%	assumption
Time spend idling (water trucks)	15%	assumption
Onsite Haul truck idling time per round t	15	standard assumption
	2	hrs driving onsite
	0.281	

GHG Scaling Factors (for Tables tab)

	LDT2	CH4:CO2	0.0011124
2	LDT2	N2O:CO2	0.0107666
	HHDT	CH4:CO2	0.0001541
	HHDT	N2O:CO2	0.0468415

Truck Types:	EMFAC Type	
Semi-Highside Dumps	HHDT	
Semi-End Dumps	HHDT	
Bottom Dumps	HHDT	
Water Trucks	HHDT	
Ready Mix Trucks	HHDT	
Boom Trucks	HHDT	
Miscellaneous	HHDT	e.g. porta potty service truck
Flatbed Trucks	MDV	e.g. Ford Superduty F550 utility bed truck (6500-8000lbs), from Rick Hutts at CH2M
Pickup trucks	LDT2	

EMFAC Type	Description
LDT2	Light-Duty Trucks (3751-5750 lbs)
MDV	Medium-Duty Trucks (5751-8500 lbs)
LHDT1	Light-Heavy-Duty Trucks (8501-10000 lbs)

Summary of Emissions

	Average Daily Emissions (lbs/day)				Total Emissions (MTCO2e)			
	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O	CO2e
Nursery Site Detention Basin								
Onsite Trucks	0.21	2.03	0.0269	0.0257	35.2583	0.0212	1.3882	36.6676
Pickup Truck Travel	0.03	0.03	0.0003	0.0003	4.0513	0.0045	0.0436	4.0994
Idling	0.03	0.48	0.0008	0.0007	4.9232	0.0001	0.2306	5.1539
Total	**0.27**	**2.53**	**0.0279**	**0.0267**	**44.2327**	**0.0258**	**1.6624**	**45.9209**
Bridge Building #2 Demolition and Riparian Restoration								
Onsite Trucks	0.12	1.08	0.0147	0.0140	11.0646	0.0071	0.3839	11.4556
Pickup Truck Travel	0.03	0.03	0.0003	0.0003	2.0670	0.0023	0.0223	2.0915
Idling	0.01	0.22	0.0004	0.0003	1.1408	0.0000	0.0534	1.1943
Total	**0.16**	**1.32**	**0.0154**	**0.0147**	**14.2723**	**0.0094**	**0.4596**	**14.7414**
Nursery Site Detention Basin - Option 6								
Onsite Trucks	0.25	2.40	0.0316	0.0302	45.2514	0.0269	1.8240	47.1023
Pickup Truck Travel	0.03	0.03	0.0003	0.0003	4.5473	0.0051	0.0490	4.6014
Idling	0.04	0.58	0.0009	0.0009	6.7059	0.0001	0.3141	7.0201
Total	**0.31**	**3.01**	**0.0328**	**0.0313**	**56.5047**	**0.0321**	**2.1871**	**58.7239**
Nursery Site Detention Basin - Option 7								
Onsite Trucks	0.31	3.00	0.0392	0.0375	37.5365	0.0220	1.5558	39.1143
Pickup Truck Travel	0.03	0.03	0.0003	0.0003	3.1142	0.0035	0.0335	3.1512
Idling	0.05	0.75	0.0012	0.0012	5.9376	0.0001	0.2781	6.2159
Total	**0.38**	**3.78**	**0.0408**	**0.0389**	**46.5884**	**0.0255**	**1.8675**	**48.4814**

For HRA - Total Annual PM (lbs)

Pollutant	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated
PM10 - DPM	4.0641	*4.0641*	2.2164	*2.2164*	4.7792	*4.7792*	5.9471	*5.9471*
PM2.5	3.8820	*3.8820*	2.1142	*2.1142*	4.5661	*4.5661*	5.6835	*5.6835*

EMFAC2017 Emission Factors - Running

Total Emissions by Speed Bin

Located here: \\sfo-file01\PROJECTS\SFO\211xxx\D211432.07 - San Anselmo Flood Management Project\03 Working Documents\ADEIR\AQ-GHG\EMFAC

GHGs = CO2e

Emissions = tons/day; Fuel = 1000 gallons/day

calendar_year	season_month	sub_area	vehicle_class	fuel	speed	process	pollutant	emission
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	NOx	0.0005838
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	PM10	2.99404E-05
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	PM2_5	2.75307E-05
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	ROG	0.000374098
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	NOx	0.000418823
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	PM10	1.78584E-05
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	PM2_5	1.64318E-05
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	ROG	0.000309439
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	NOx	1.31626E-05
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	PM10	7.05067E-09
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	PM2_5	6.48283E-09
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	ROG	4.45331E-06
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	NOx	5.21127E-06
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	PM10	4.64778E-07
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	PM2_5	4.44672E-07
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	ROG	8.42136E-06
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	NOx	1.09871E-05
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	PM10	1.05508E-06
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	PM2_5	1.00944E-06
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	ROG	1.38642E-05
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	NOx	0.031148598
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	PM10	0.00039545
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	PM2_5	0.000378343
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	ROG	0.003037706
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	CH4	0.002245772
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	CO2	2.461724828
2019	Annual	Marin (SF)	LDT2	Gas	5	RUNEX	N2O	0.013199865
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	CH4	0.001690529
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	CO2	1.647719749
2019	Annual	Marin (SF)	MDV	Gas	5	RUNEX	N2O	0.009049638
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	CH4	2.32629E-05
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	CO2	0.008429718
2019	Annual	Marin (SF)	HHDT	Gas	5	RUNEX	N2O	0.000137184
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	CH4	9.7789E-06
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	CO2	0.025332393
2019	Annual	Marin (SF)	LDT2	Dsl	5	RUNEX	N2O	0.001186606
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	CH4	1.60992E-05
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	CO2	0.062392098
2019	Annual	Marin (SF)	MDV	Dsl	5	RUNEX	N2O	0.002922536
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	CH4	0.00352734
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	CO2	6.47514176
2019	Annual	Marin (SF)	HHDT	Dsl	5	RUNEX	N2O	0.30330503

Default_Marin_2019_Annual_Speed_v2_emissions

Default_Marin_2019_Annual_Speed_v2_ghg

VMT by speed bin miles/day

calendar_year	sub_area	vehicle_class	fuel	speed	vmt
2019	Marin (SF)	LDT2	Gas	5	2585.05952
2019	Marin (SF)	MDV	Gas	5	1432.986202
2019	Marin (SF)	HHDT	Gas	5	1.427760007
2019	Marin (SF)	LDT2	Dsl	5	29.55078501
2019	Marin (SF)	MDV	Dsl	5	58.6098394
2019	Marin (SF)	HHDT	Dsl	5	1513.044123

Default_Marin_2019_Annual_Speed_v2_vmt

Total Emissions by Aggregated Speed

GHGs = CO2e

Emissions = tons/day; Fuel = 1000 gallons/day

calendar_year	season_month	sub_area	vehicle_class	fuel	process	pollutant	emission
2019	Annual	Marin (SF)	LDT2	Gas	DIURN	ROG	0.01583614
2019	Annual	Marin (SF)	LDT2	Gas	HOTSOAK	ROG	0.0366876
2019	Annual	Marin (SF)	LDT2	Gas	RESTLOSS	ROG	0.01553303
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	NOx	0.21109379
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	PM10	0.00298832
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	PM2_5	0.00274791
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	ROG	0.03919917
2019	Annual	Marin (SF)	LDT2	Gas	RUNLOSS	ROG	0.12549189
2019	Annual	Marin (SF)	LDT2	Gas	STREX	NOx	0.09858348
2019	Annual	Marin (SF)	LDT2	Gas	STREX	PM10	0.00050805
2019	Annual	Marin (SF)	LDT2	Gas	STREX	PM2_5	0.00046722
2019	Annual	Marin (SF)	LDT2	Gas	STREX	ROG	0.1108858
2019	Annual	Marin (SF)	MDV	Gas	DIURN	ROG	0.01055051
2019	Annual	Marin (SF)	MDV	Gas	HOTSOAK	ROG	0.02361079
2019	Annual	Marin (SF)	MDV	Gas	RESTLOSS	ROG	0.01054609
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	NOx	0.15827574
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	PM10	0.00181356
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	PM2_5	0.00166947
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	ROG	0.03512694
2019	Annual	Marin (SF)	MDV	Gas	RUNLOSS	ROG	0.07708475
2019	Annual	Marin (SF)	MDV	Gas	STREX	NOx	0.06834171
2019	Annual	Marin (SF)	MDV	Gas	STREX	PM10	0.00034092
2019	Annual	Marin (SF)	MDV	Gas	STREX	PM2_5	0.00031404
2019	Annual	Marin (SF)	MDV	Gas	STREX	ROG	0.08243168
2019	Annual	Marin (SF)	HHDT	Gas	DIURN	ROG	5.1846E-08
2019	Annual	Marin (SF)	HHDT	Gas	HOTSOAK	ROG	1.8437E-06
2019	Annual	Marin (SF)	HHDT	Gas	RESTLOSS	ROG	2.5487E-08
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	NOx	0.00159879
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	PM10	2.3806E-07
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	PM2_5	2.1889E-07
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	ROG	0.00015092
2019	Annual	Marin (SF)	HHDT	Gas	RUNLOSS	ROG	8.725E-06
2019	Annual	Marin (SF)	HHDT	Gas	STREX	NOx	1.9722E-07
2019	Annual	Marin (SF)	HHDT	Gas	STREX	PM10	1.4896E-08
2019	Annual	Marin (SF)	HHDT	Gas	STREX	PM2_5	1.3696E-08
2019	Annual	Marin (SF)	HHDT	Gas	STREX	ROG	4.4025E-08
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	NOx	0.00102039
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	PM10	0.00010954
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	PM2_5	0.0001048
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	ROG	0.00031864
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	NOx	0.0027358
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	PM10	0.00024237
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	PM2_5	0.00023189
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	ROG	0.00056554
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	NOx	0.48691435
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	PM10	0.00803757
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	PM2_5	0.00768987
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	ROG	0.01888548
2019	Annual	Marin (SF)	HHDT	Dsl	STREX	NOx	0.01161369
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	CH4	0.23188701
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	CO2	698.212568
2019	Annual	Marin (SF)	LDT2	Gas	RUNEX	N2O	4.7936308
2019	Annual	Marin (SF)	LDT2	Gas	STREX	CH4	0.56687024
2019	Annual	Marin (SF)	LDT2	Gas	STREX	CO2	19.8063604
2019	Annual	Marin (SF)	LDT2	Gas	STREX	N2O	2.93695699

Aggregated VMT miles/day

calendar_year	sub_area	vehicle_class	fuel	vmt
2019	Marin (SF)	LDT2	Gas	1725363
2019	Marin (SF)	MDV	Gas	956427.24
2019	Marin (SF)	HHDT	Gas	319.05479
2019	Marin (SF)	LDT2	Dsl	19723.271
2019	Marin (SF)	MDV	Dsl	39118.344
2019	Marin (SF)	HHDT	Dsl	78085.182

Default_Marin_2019_Annual_v2_vmt

2019	Annual	Marin (SF)	MDV	Gas	RUNEX	CH4	0.18262312
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	CO2	467.284799
2019	Annual	Marin (SF)	MDV	Gas	RUNEX	N2O	3.33890169
2019	Annual	Marin (SF)	MDV	Gas	STREX	CH4	0.39710943
2019	Annual	Marin (SF)	MDV	Gas	STREX	CO2	13.8055593
2019	Annual	Marin (SF)	MDV	Gas	STREX	N2O	1.8211462
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	CH4	0.00078838
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	CO2	0.79099762
2019	Annual	Marin (SF)	HHDT	Gas	RUNEX	N2O	0.01666297
2019	Annual	Marin (SF)	HHDT	Gas	STREX	CH4	2.1012E-07
2019	Annual	Marin (SF)	HHDT	Gas	STREX	CO2	0.00229609
2019	Annual	Marin (SF)	HHDT	Gas	STREX	N2O	2.8628E-06
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	CH4	0.00037001
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	CO2	6.96407073
2019	Annual	Marin (SF)	LDT2	Dsl	RUNEX	N2O	0.32620717
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	CH4	0.0006567
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	CO2	18.1943815
2019	Annual	Marin (SF)	MDV	Dsl	RUNEX	N2O	0.85225121
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	CH4	0.02192954
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	CO2	142.276698
2019	Annual	Marin (SF)	HHDT	Dsl	RUNEX	N2O	6.66444686

Default_Marin_2019_Annual_v2_emissions
Default_Marin_2019_Annual_v2_ghg

Calculated EFs (g/mi) GHGs = CO2e

Vehicle Type	Fuel	Speed	VMT	ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
LDT2	Gas	5	2585.05952	0.131283688	0.204875181	0.0105071	0.00966144	863.9026765	0.788117357	4.632279917
MDV	Dsl	5	58.6098394	0.214595696	0.17006181	0.0163309	0.01562442	965.7282131	0.249188998	45.23610991
HHDT	Dsl	5	1513.044123	1.821335883	18.67595324	0.2371024	0.22684548	3882.339841	2.114908362	181.8544279
LDT2	Gas	Aggregated	1725362.976	0.180680396	0.162826363	0.0018384	0.00169049	377.5298361	0.419981541	4.064694432
MDV	Dsl	Aggregated	39118.34374	0.013115287	0.063445409	0.0056208	0.00537764	421.941943	0.0152295	19.76437247
HHDT	Dsl	Aggregated	78085.18166	0.219409436	5.791843668	0.0933796	0.08934006	1652.954936	0.254775001	77.42680614

Change from original EFs

ROG	NOX	PM10	PM2_5	CO2	CH4	N2O
17%	11%	-5%	-5%	-30%	1662%	60270%
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
100%	-8%	360%	360%	-14%	-12%	122097%
11%	22%	-10%	-10%	-7%	4679%	73011%
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#N/A
44%	9%	243%	243%	-5%	199%	135676%

Onsite Truck Travel

Hours per Day of Truck Operation	Nursery	BB2	Nursery 6	Nursery 7
Pickups	10	10	10	10
Flatbed	10	8	10	10
Water Trucks	10	8	10	10
Haul Trucks	10	8	10	10
Other HD Trucks	10	8	10	10

Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS and email from Gazaway, Constance/SJC on 4/12/18

Total Number of Trucks operating onsite
Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS

Nursery Site Detention Basin — **Total Number of Trucks operating onsite**

Item	Operation	Pickups	Flatbed	Water Trucks	Haul Trucks	Other HD	Workdays	
1	Mobilization/Erosion Control	5	1		0	1	5	*7*
2	Demo Wood Framed Building	5	1		1	1	1	*8*
3	Demo Misc Structures	5	1		1	1	5	*8*
4	Clearing & Grubbing	5	1		0	1	3	*7*
5	Remove Trees	5	1		0	1	3	*7*
6	Remove septic tanks	5	1		0	1	1	*7*
7	Remove Fire Hydrant & Water Valves	5	1		0	1	1	*7*
8	Remove OH Electrical & Poles	5	1		0	2	2	*8*
9	Remove Fencing	5	1		0	1	1	*7*
10	Abandon Water Well	5	1		0	1	1	*7*
11	Top Soil Stripping/Stockpile	5	1	1	0	1	2	*8*
12	Excavation (Cut)	5	1	1	0	1	18	*8*
13	Over-excavation beneath berm	5	1	1	0	1	3	*8*
14	Over-excavation at spillway	5	1	1	0	1	3	*8*
15	Backfill Over-Excavated Areas	5	1	1	0	1	7	*8*
16	Off-Haul Trucks				29		13.61	*29*
17	Catch Basins, Manholes, Drainage Pi	5		1	0	1	15	*7*
18	Precast Box Culvert (6'x4' & 10'x5'), E	5		1	0	1	8	*7*
19	Construct Overflow Weir/Floodwall	5	1		0	2	20	*8*
20	Pour Concrete Overflow Weir/Floodv	5	1		0	3	3	*9*
21	Embankment (Berm)	5	1	1	0	1	6	*8*
22	Riprap	5	1		6	1	10	*13*
23	Riprap Trucks				0		0	*0*
24	Seepage cutoff wall 3' x 7'	5	1		0	2	13	*8*
25	Finish Grade Slopes/Seasonal Chann	5		1	0	1	2	*7*
26	Place Topsoil	5		1	0	1	1	*7*
27	Plantings	5	1		0	1	5	*7*
28	Hydroseeding	5		1	0	1	1	*7*
29	Fence	5	1		0	1	5	*7*
30	Demobilization	5	1		0	1	2	*7*
	Total	**140**	**23**	**11**	**37**	**33**	**160.612676**	***244***

Bridge Building #2 Demolition — **Total Number of Trucks operating onsite**

Item	Operation	Pickups	Flatbed	Water Trucks	Haul Trucks	Other HD	Workdays	
1	Mobilization/Er	5	1		0	1	5	*7*
2	Demo Wood Fr	5	1	1	2	1	2	*10*
3	Demo Concrete	5	1	1	2	1	15	*10*
4	Clearing & Grul	5	1	1	2	1	2	*10*
5	Top Soil Strippi	5	1	1	0	1	1	*8*
6	1/2 Ton Riprap.	5		1	7	1	10	*14*
7	Terrace Flood F	5		1	0	1	2	*7*
8	Flood Walls	5	1		0	2	9	*8*
9	Storm Drain	5	1	1	1	1	1	*9*
10	Bioengineered	5		1	0	1	14	*7*
11	Place Topsoil	5			0	1	1	*6*
12	Plantings	5	1		0	1	10	*7*
13	Guardrail	5	1		0	1	1	*7*
14	Demobilization	5	1		0	1	2	*7*
	Total	**70**	**10**	**8**	**14**	**15**		***117***

Nursery Site Detention Basin - Option 6 — **Total Number of Trucks operating onsite**

Item	Operation	Pickups	Flatbed	Water Trucks	Haul Trucks	Other HD	Workdays	
1	Mobilization/Erosion Control	5	1		0	1	5	*7*
2	Demo Wood Framed Building	5	1		1	1	1	*8*
3	Demo Misc Structures	5	1		1	1	5	*8*
4	Clearing & Grubbing	5	1		1	1	3	*8*
5	Remove Trees	5	1		1	1	3	*8*
6	Remove septic tanks	5	1		0	1	1	*7*
7	Remove Fire Hydrant & Water Valves	5	1		0	1	1	*7*
8	Remove OH Electrical & Poles	5	1		0	2	2	*8*
9	Remove Fencing	5	1		0	1	1	*7*
10	Abandon Water Well	5	1		0	1	1	*7*
11	Top Soil Stripping/Stockpile	5	1	1	0	1	2	*8*
12	Excavation (Cut)	5	1	1	0	1	23	*8*
13	Over-excavation beneath berm	5	1	1	0	1	3	*8*
14	Over-excvation at spillway	5	1	1	0	1	3	*8*
15	Backfill Over-Excavated Areas	5	1	1	0	1	7	*8*
16	Off-Haul Trucks				29		20.32	*29*
17	Catch Basins, Manholes, Drainage Pi	5		1	0	1	15	*7*
18	Precast Box Culvert (6'x4' & 10'x5'), E	5		1	0	1	8	*7*
19	Storm Water Lift Station	5		1	0	1	15	*7*
20	Construct Overflow Weir/Floodwall	5	1		0	2	20	*8*
21	Pour Concrete Overflow Weir/Floodv	5	1		0	3	3	*9*
22	Embankment (Berm)	5	1	1	0	1	4	*8*
23	Riprap	5	1		6	1	10	*13*
24	Riprap Trucks				0		0	*0*
25	Seepage cutoff wall 3' x 7'	5	1		0	2	13	*8*
26	Finish Grade Slopes/Seasonal Chann	5		1	0	1	2	*7*
27	Place Topsoil	5		1	0	1	1	*7*
28	Plantings	5	1		0	1	5	*7*
29	Hydroseeding	5		1	0	1	1	*7*
30	Fence	5	1		0	1	5	*7*
31	Demobilization	5	1		0	1	2	*7*
	Total	**145**	**23**	**12**	**39**	**34**	**185.323944**	***253***

Nursery Site Detention Basin - Total Number of Trucks operating onsite

Item	Operation	Pickups	Flatbed	Water Trucks	Haul Trucks	Other HD	Workdays	
1	Mobilization/Er	5	1		0	1	5	*7*
2	Demo Wood Fr	5	1		1	1	1	*8*
3	Demo Misc Stru	5	1		1	1	5	*8*
4	Clearing & Grul	5	1		1	1	2	*8*
5	Remove Trees	5	1		1	1	3	*8*
6	Remove septic	5	1		0	1	1	*7*
7	Remove Fire Hy	5	1		0	1	1	*7*
8	Remove OH Ele	5	1		0	2	2	*8*
9	Remove Fencin	5	1		0	1	1	*7*
10	Abandon Wate	5	1		0	1	1	*7*
11	Top Soil Strippi	5	1	1	0	1	1	*8*
12	Excavation (Cut	5	1	1	0	1	19	*8*
13	Over-excavatio	5	1	1	0	1	3	*8*
14	Backfill Over-Ex	5	1	1	0	1	4	*8*
15	Off-Haul Trucks				29		19.42	*29*
16	Catch Basins, M	5	1	1	0	1	15	*8*
17	Construct Over	5	1		0	2	20	*8*
18	Pour Concrete	5	1		0	3	3	*9*
19	Embankment (E	5	1	1	0	1	1	*8*
20	Riprap	5			6	1	9	*12*
21	Riprap Trucks				0		0	*0*
22	Finish Grade Sl	5		1	0	1	2	*7*
23	Place Topsoil	5		1	0	1	1	*7*
24	Plantings	5	1		0	1	5	*7*
25	Hydroseeding	5		1	0	1	1	*7*
26	Fence	5	1		0	1	5	*7*
27	Demobilization	5	1		0	1	2	*7*
	Total	**125**	**21**	**9**	**39**	**29**	**132.42254**	***223***

Total Truck Days	Nursery	BB2	Nursery 6	Nursery 7	
Pickups	735	375	825	565	
Flatbed	120	48	123	100	
Water Trucks	66	47	84	47	
Haul Trucks	461	109	661	628	0.28
Other Trucks	188	84	206	141	
Total	**1,570**	**663**	**1,899**	**1,481**	

Total Miles traveled onsite (5 mph)	Nursery	BB2	Nursery 6	Nursery 7	
Pickups	7,350	3,750	8,250	5,650	*= total truck days * hrs/day * 5 mph * 25% moving time*
Flatbed	1,200	384	1,230	1,000	""
Water Trucks	660	376	840	470	""
Haul Trucks	4,608	872	6,614	6,283	""
Other Trucks	1,880	672	2,060	1,410	""

Total Trips	Nursery	BB2	Nursery 6	Nursery 7	
Pickups	735	375	825	565	
Flatbed	360	144	369	300	
Water Trucks	660	235	840	470	
Haul Trucks	2,245	418	3,210	3,041	
Other Trucks	499	84	563	464	
Total	**4,499**	**1,256**	**5,807**	**4,840**	
Total HD	**3,404**	**737**	**4,613**	**3,975**	
	2,879	**618**	**3,937**	**3,654**	
	3,104	646	4,142	3,805	*includes few other trucks not in truck trip table*

Source: San Anselmo Flood Options 2, 6 and 7 Equip and Work Durations R6_BS

Emissions

	General Information				Total Emissions (tons)				Average Daily Emissions (lbs/day)				Total Emissions (MTCO2e)		
	Vehicle Type	Fuel	Speed	Total miles	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O
Nursery Site Detention Basin															
Pickups	LDT2	GAS	5	7,350	0.001063659	0.0016599	8.5128E-05	7.82769E-05	0.014471545	0.022583616	0.00115821	0.001064992	6.349684672	0.0057927	0.034047257
Flatbed	MDV	DSL	5	1,200	0.000283861	0.000225	2.1602E-05	2.06676E-05	0.00386206	0.003060588	0.000293906	0.000281191	1.158873856	0.000299	0.054283332
Water Trucks	HHDT	DSL	5	660	0.001325068	0.0135872	0.0001725	0.000165036	0.018028134	0.18486024	0.002346912	0.002245385	2.562344295	0.0013958	0.120023922
Haul Trucks	HHDT	DSL	5	4,608	0.009250732	0.0948569	0.00120427	0.001152169	0.125860306	1.290569854	0.016384558	0.015675769	17.88856433	0.0097448	0.837926293
Other Trucks	HHDT	DSL	5	1,880	0.003774436	0.038703	0.00049136	0.000470102	0.051352867	0.526571594	0.006685142	0.006395946	7.2987989	0.003976	0.341886325
Total					**0.015697756**	**0.149032**	**0.00197485**	**0.001886251**	**0.213574912**	**2.027645893**	**0.026868727**	**0.025663283**	**35.25826605**	**0.0212084**	**1.38816713**
Bridge Building #2 Demolition and Riparian Restoration															
Pickups	LDT2	GAS	5	3,750	0.000542683	0.0008469	4.3433E-05	3.99372E-05	0.014471545	0.022583616	0.00115821	0.001064992	3.239635037	0.0029554	0.01737105
Flatbed	MDV	DSL	5	384	9.08357E-05	7.199E-05	6.9127E-06	6.61362E-06	0.002422284	0.001919601	0.000184338	0.000176363	0.370839634	9.569E-05	0.017370666
Water Trucks	HHDT	DSL	5	376	0.000754887	0.0077406	9.8272E-05	9.40204E-05	0.020130324	0.206416065	0.002620576	0.002507211	1.45975978	0.0007952	0.068377265
Haul Trucks	HHDT	DSL	5	872	0.001750696	0.0179516	0.00022791	0.000218047	0.046685219	0.478709597	0.006077505	0.005814595	3.385400341	0.0018442	0.158577061
Other Trucks	HHDT	DSL	5	672	0.00134916	0.0138343	0.00017563	0.000168036	0.0359776	0.368913818	0.004683582	0.004480972	2.608932373	0.0014212	0.122206176
Total					**0.004488261**	**0.0404454**	**0.00055216**	**0.000526655**	**0.119686972**	**1.078542697**	**0.014724211**	**0.014044133**	**11.06456716**	**0.0071118**	**0.383902218**
Nursery Site Detention Basin - Option 6															
Pickups	LDT2	GAS	5	8,250	0.001193902	0.0018631	9.5552E-05	8.78618E-05	0.014471545	0.022583616	0.00115821	0.001064992	7.127197081	0.006502	0.038216309
Flatbed	MDV	DSL	5	1,230	0.000290958	0.0002306	2.2142E-05	2.11843E-05	0.003526763	0.002794873	0.000268389	0.000256779	1.187845702	0.0003065	0.055640415
Water Trucks	HHDT	DSL	5	840	0.00168645	0.0172928	0.00021954	0.000210046	0.020441818	0.209610124	0.002661126	0.002546007	3.261165466	0.0017765	0.152757719
Haul Trucks	HHDT	DSL	5	6,614	0.013278673	0.1361593	0.00172862	0.001653845	0.160953612	1.650416132	0.020953022	0.020046604	25.67757698	0.0139879	1.202774941
Other Trucks	HHDT	DSL	5	2,060	0.004135818	0.0424086	0.0005384	0.000515112	0.050131126	0.514043875	0.006526095	0.006243779	7.997620072	0.0043567	0.374620122
Total					**0.020585801**	**0.1979545**	**0.00260426**	**0.002488048**	**0.249524864**	**2.399448621**	**0.031566843**	**0.03015816**	**45.2514053**	**0.0269296**	**1.824009507**
Nursery Site Detention Basin - Option 7															
Pickups	LDT2	GAS	5	5,650	0.000817642	0.001276	6.5439E-05	6.0172E-05	0.014471545	0.022583616	0.00115821	0.001064992	4.881050122	0.0044529	0.026172382
Flatbed	MDV	DSL	5	1,000	0.000236551	0.0001875	1.8002E-05	1.7223E-05	0.004186747	0.003317894	0.000318614	0.000304831	0.965728213	0.0002492	0.04523611
Water Trucks	HHDT	DSL	5	470	0.000943609	0.0096758	0.00012284	0.000117526	0.016701043	0.171252266	0.00217415	0.002080097	1.824699725	0.000994	0.085471581
Haul Trucks	HHDT	DSL	5	6,283	0.012613311	0.1293367	0.00164201	0.001570975	0.223244448	2.289145516	0.029062075	0.027804862	24.39093675	0.013287	1.142506847
Other Trucks	HHDT	DSL	5	1,410	0.002830827	0.0290273	0.00036852	0.000352577	0.050103129	0.513756799	0.006522451	0.006240292	5.474099175	0.002982	0.256414743
Total					**0.017441941**	**0.1695032**	**0.00221681**	**0.002118472**	**0.308706912**	**3.000056091**	**0.0392355**	**0.037495075**	**37.53651399**	**0.0219651**	**1.555801663**
					ROG	*NOX*	*PM10*	*PM2_5*	0.333	3.106	0.042	0.040	*CO2*	*CH4*	*N2O*
									0.056	1.208	0.003	0.003			

Pickup Truck Travel - offsite

	Nursery	BB2	Nursery 6	Nursery 7
Total pickup loads	735	375	825	565
one-way trip distance (CalEEMod Vendor	7.3	7.3	7.3	7.3
Total miles	10,731	5,475	12,045	8,249

	General Information				Total Emissions (tons)				Average Daily Emissions (lbs/day)				Total Emissions (MTCO2e)		
	Vehicle Type	Fuel	Speed	Total miles	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O
Nursery Site Detention Basin	LDT2	GAS	Aggregated	10,731	0.00213725	0.0019261	2.1746E-05	1.99967E-05	0.029078234	0.026204852	0.000295862	0.000272064	4.051272671	0.0045068	0.043618236
Bridge Building #2 Demolition and Ripari	LDT2	GAS	Aggregated	5,475	0.001090434	0.0009827	1.1095E-05	1.02024E-05	0.029078234	0.026204852	0.000295862	0.000272064	2.066975853	0.0022994	0.022254202
Nursery Site Detention Basin - Option 6	LDT2	GAS	Aggregated	12,045	0.002398954	0.0021619	2.4409E-05	2.24453E-05	0.029078234	0.026204852	0.000295862	0.000272064	4.547346876	0.0050587	0.048959244
Nursery Site Detention Basin - Option 7	LDT2	GAS	Aggregated	8,249	0.00164292	0.0014806	1.6716E-05	1.53716E-05	0.029078234	0.026204852	0.000295862	0.000272064	3.114243618	0.0034644	0.033529664

Idling

Annual Hours Idling	**Nursery**	**BB2**	**Nursery 6**	**Nursery 7**	***Equation***
Water Trucks	99	56	126	71	*= total truck days * hrs/day * 15% idling time*
Haul Trucks	561	105	803	760	*= total trips * 15 min per trip * 1/60 hrs per min*
Other Trucks	125	21	141	116	*= total trips * 15 min per trip * 1/60 hrs per min*

EMFAC2014 Idling Emissions Inventory - NOT USED

calendar_year	season_month	sub_area	vehicle_class	fuel	process	pollutant	emission
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	CH4	0.0001012
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	CO2	8.5811021
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	Fuel	0.7722992
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	NOx	0.0502548
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	PM10	9.126E-05
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	PM2_5	8.732E-05
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	ROG	0.0015049

Default_Marin_2019_Annual_emission_20171010102613

EMFAC2017 Idling Emission Rates (g/hr-veh) GHGs = CO2e

calendar_year	season_month	sub_area	vehicle_class	Fuel	process	pollutant	emission_rat	Change from original EFs
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	NOx	40.6292045	8%
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	ROG	2.49832886	125%
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	CO2	6271.59682	-3%
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	CH4	0.1160409	54%
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	PM10	0.06610876	6%
2019	Annual	Marin (SF)	HHDT	Dsl	IDLEX	PM2_5	0.06324892	6%

PL_Marin_2019_Annual_Idling

Emissions

N2O separate calc

	General Information			Total Emissions (tons)				Average Daily Emissions (lbs/day)				Total Emissions (MTCO2e)		
	Vehicle Type	Fuel	Annual Hours Idling	ROG	NOX	PM10 Exh	PM2.5 Exh	ROG	NOX	PM10 Exh	PM2.5 Exh	CO2	CH4	N2O
Nursery Site Detention Basin														
Water Trucks	HHDT	D	99	0.00027264	0.004433816	7.214E-06	6.9023E-06	0.003709382	0.060324025	9.81547E-05	9.39085E-05	0.620888085	1.1488E-05	0.0290833
Haul Trucks	HHDT	D	561	0.001545646	0.025136153	4.09E-05	3.913E-05	0.0210292	0.341988477	0.000556458	0.000532386	3.519933714	6.5128E-05	0.1648788
Other Trucks	HHDT	D	125	0.000343553	0.005587056	9.091E-06	8.6976E-06	0.004674196	0.076014365	0.000123685	0.000118334	0.782381703	1.44761E-05	0.0366479
Total				**0.002161839**	**0.035157025**	**5.72E-05**	**5.473E-05**	**0.029412779**	**0.478326868**	**0.000778297**	**0.000744628**	**4.923203501**	**9.10921E-05**	**0.23061**
Bridge Building #2 Demolition and Riparian Restoration														
Water Trucks	HHDT	D	56	0.000155322	0.002525931	4.11E-06	3.9322E-06	0.004141919	0.067358172	0.0001096	0.000104859	0.35371806	6.54471E-06	0.0165687
Haul Trucks	HHDT	D	105	0.000287786	0.004680139	7.615E-06	7.2857E-06	0.0076743	0.124803706	0.000203071	0.000194286	0.655381867	1.21263E-05	0.030699
Other Trucks	HHDT	D	21	5.78326E-05	0.000940506	1.53E-06	1.4641E-06	0.001542204	0.025080171	4.08085E-05	3.90432E-05	0.131703533	2.43686E-06	0.0061692
Total				**0.000500941**	**0.008146577**	**1.326E-05**	**1.2682E-05**	**0.013358422**	**0.217242049**	**0.00035348**	**0.000338188**	**1.140803461**	**2.11078E-05**	**0.0534369**
Nursery Site Detention Basin - Option 6														
Water Trucks	HHDT	D	126	0.000346996	0.005643038	9.182E-06	8.7847E-06	0.00420601	0.068400465	0.000111296	0.000106481	0.790221199	1.46212E-05	0.0370151
Haul Trucks	HHDT	D	803	0.002210033	0.03594078	5.848E-05	5.595E-05	0.02678828	0.435645819	0.00070885	0.000678185	5.032956446	9.31228E-05	0.235751
Other Trucks	HHDT	D	141	0.000387616	0.006303632	1.026E-05	9.8131E-06	0.004698381	0.076407662	0.000124325	0.000118947	0.882727252	1.63328E-05	0.0413482
Total				**0.002944645**	**0.047887451**	**7.792E-05**	**7.4548E-05**	**0.035692671**	**0.580453947**	**0.000944471**	**0.000903613**	**6.705904897**	**0.000124077**	**0.3141143**
Nursery Site Detention Basin - Option 7														
Water Trucks	HHDT	D	71	0.000194152	0.003157414	5.138E-06	4.9153E-06	0.003436326	0.055883439	9.09293E-05	8.69957E-05	0.442147576	8.18088E-06	0.0207108
Haul Trucks	HHDT	D	760	0.002093679	0.034048571	5.54E-05	5.3005E-05	0.037056272	0.602629572	0.000980553	0.000938135	4.76798148	8.82201E-05	0.2233392
Other Trucks	HHDT	D	116	0.000319457	0.005195178	8.453E-06	8.0875E-06	0.005654097	0.091950056	0.000149614	0.000143142	0.727505231	1.34607E-05	0.0340774
Total				**0.002607288**	**0.042401163**	**6.899E-05**	**6.6007E-05**	**0.046146696**	**0.750463068**	**0.001221097**	**0.001168272**	**5.937634287**	**0.000109862**	**0.2781274**
				ROG	*NOx*	*PM10*	*PM2_5*					*CO2*	*CH4*	
								0.04	0.70	0.00	0.00			
								0.17	5.95	0.01	0.01			

Water Trucks
Haul Trucks
Other Trucks

B-8 CalEEMod Output Summary

CalEEMod Outputs

updated: 4/16/2018

Paste from CalEEMod: see *OutputSummary_v2_ops.xlsx*

Operation

Site	Year	Category 1	Category 2	Mit / Unmit	Annual Emissions (tons or MT per year for GHG)												
					ROG	NOX	CO	SOX	PM10 Exh	PM10 Dst	PM10 T	PM2.5 Ex	PM2.5 Dst	PM2.5 T	CO2	CH4	N2O
Nursery	2019	Fugitive Dust	Offroad Equipment	Unmitigated	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	2019	Off-Road	Offroad Equipment	Unmitigated	0.001	0.012	0.007	0.000	0.000	-	0.000	0.000	-	0.000	2.919	-	-
Nursery	2019	Paving	Offroad Equipment	Unmitigated	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	2019	Archit. Coating	Offroad Equipment	Unmitigated	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	2019	Hauling	Onroad Truck Travel	Unmitigated	0.001	0.029	0.008	0.000	0.000	0.000	0.001	0.000	0.000	0.000	7.027	-	-
Nursery	2019	Vendor	Onroad Truck Travel	Unmitigated	-	-	-	-	-	-	-	-	-	-	-	-	-
Nursery	2019	Worker	Worker Commute	Unmitigated	0.000	0.000	0.002	-	-	0.000	0.000	-	0.000	0.000	0.435	-	-

B-9 Health Risk Assessment

HRA - Screening

Updated: 4/5/2018

Since AERSCREEN calculates maximum 1-hr concentration based on continuous emissions (which is then converted to annual), the 1-hr emission rate should be based on the emission rate during the entire construction period (24 hrs/day, 7 days per week).

HRA Notes:

Concentrations modeled using AERSCREEN worst-case 1-hr, scaled to annual

BAAQMD recommends short-term projects "use of actual emission rates over a minimum 3-year duration for cancer risk assessments involving projects lasting 3 years or less." This was not done to be conservative.

Since AERSCREEN calculates maximum 1-hr concentration based on continuous emissions (which is then converted to annual), the 1-hr emission rate should be based on the emission rate during the entire construction period (24 hrs/day, 7 days per week).

Normally, we use a worker adjustment factor to estimate risk for school and daycare receptors, but this is used if AERMOD models sources using a non-continuous emissions schedule (e.g. work hours). However, because we use AERSCREEN, which assumes a continuous emission rate based on the actual construction schedule of 5 days per week and 8 hrs/day (and estimates maximum 1-hr concentrations), concentrations are based on continuous emissions, and we don't need the adjustment factor.

To estimate annual average PM2.5 concentrations, divided PM2.5 exhaust emissions by the full 24hrs/day and 7 days/week when construction is occurring. This is still conservative because emissions would not occur for 6-7 months of the year. Could divide by the full 365 days/year for the entire year to be less conservative, but did not do this.

DPM Emissions (lbs)

DPM Emissions (lbs)	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	NOTES		
	34.60	6.56	18.03	5.61	42.00	8.76	21.86	5.86	<- Cancer		
	0.47	0.10	0.82	0.28	0.48	0.11	0.45	0.13	<- PM2.5		
Off-Road	71.27	9.92	21.01	4.91	82.44	13.08	48.57	8.27		-86%	-77%
Hauling	28.03	28.03	11.90	11.90	33.84	33.84	42.58	42.58			
Onsite Trucks	4.06	4.06	2.22	2.22	4.78	4.78	5.95	5.95			
Total	103.36	42.02	35.12	19.02	121.06	51.70	97.10	56.80			
Scaling Factor for HD trucks	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	haul trip = 20 mile one-way trip; assume 0.25 mile onsite segment (once incom		
DPM lbs - Scaled	75.68	14.34	23.38	7.27	87.64	18.28	55.05	14.75			
DPM lbs/hr	0.0155	0.0029	0.0094	0.0029	0.0159	0.0033	0.0147	0.0039	based on 7 days/week, 24 hrs/day; see note above		
DPM g/s	**0.0019**	**0.0004**	**0.0012**	**0.0004**	**0.0020**	**0.0004**	**0.0019**	**0.0005**	NOTE: original HRA based on 5 days/week, 10 hrs/day; see note above		
	0.0065	*0.0012*	*0.0039*	*0.0012*	*0.0067*	*0.0014*	*0.0061*	*0.0016*	*based on 5 days/week, 10 hrs/day; see note above*		
	3.33	*3.33*	*3.33*	*3.33*	*3.35*	*3.35*	*3.31*	*3.31*	*ratio*		

PM2.5 Exhaust Emissions (lbs)

DPM Emissions (lbs)	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	NOTES
Off-Road	66.43	9.92	19.68	4.91	77.10	13.08	45.53	8.27	
Hauling	26.82	26.82	11.38	11.38	32.38	32.38	40.74	40.74	
Onsite Trucks	3.88	3.88	2.11	2.11	4.57	4.57	5.68	5.68	
Total	97.13	40.62	33.17	18.40	114.04	50.02	91.96	54.69	
Scaling Factor for HD trucks	*0.013*	*0.013*	*0.013*	*0.013*	*0.013*	*0.013*	*0.013*	*0.013*	haul trip = 20 mile one-way trip; assume 0.25 mile onsite segment (once incoming, once outgoing)
PM2.5 lbs - Scaled	70.64	14.14	21.93	7.16	82.07	18.05	51.73	14.46	
PM2.5 lbs/hr	0.0144	0.0029	0.0088	0.0029	0.0149	0.0033	0.0138	0.0039	based on 7 days/week, 24 hrs/day; see note above
PM2.5 g/s	**0.0018**	**0.0004**	**0.0011**	**0.0004**	**0.0019**	**0.0004**	**0.0017**	**0.0005**	

AERSCREEN Inputs - DPM

	Nursery	BB2	Notes
Title	Nursery	BB2	
Units	M	M	
Source Type	A	A	
DPM emission rate (g/s)	1	1	
Release Height above ground (meters)	3.89	3.89	Release height for off-road construction equipment and on-road operational mobile sources from the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012).
Maximum horizontal dimension of area source (meters)	185	50	
Minimum horizontal dimension of area source (meters)	150	40	
Initial Vertical Dimension (meters)	1.4	1.4	Initial vertical dimension for off-road construction equipment and on-road operational mobile sources from the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012).
rural/urban	rural	urban	
population of urban area	-	12,599	https://www.census.gov/quickfacts/fact/table/sananselmotowncalifornia,sanfranciscocountycalifornia,US/PST045216
min distance to ambient air (meters)	default	default	
NO2 chemistry	1	1	
max distance to probe	default	default	
include discrete receptors	no	no	
use flagpole receptors	yes	yes	
flagpole receptor height (meters)	1.5	1.5	BAAQMD 2012, Recommended Methods for Screening and Modeling Local Risks and Hazards
source elevation	default	default	
min ambient temperature (F)	*41*	*41*	http://www.intellicast.com/Local/History.aspx?location=USCA0976
max ambient temperature (F)	*85*	*85*	http://www.intellicast.com/Local/History.aspx?location=USCA0976
min ambient temperature (K)	278	278	
max ambient temperature (K)	303	303	
min wind speed (m/s)	default	default	
anemometer height (m)	default	default	
surface characteristics	2	2	
Dominant surface profile	7	7	
dominant climate profile	1	1	
adjust	no	no	
debug	no	no	
Output file name	Nursery.out	BB2.out	

DPM Concentrations - Maximum 1-hr (ug/m3)

Distance (m) Nursery	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	Distance (m) BB2
1	**1452.3**	*1452.30*	**4880.90**	*4880.90*	*1452.30*	*1452.30*	*1452.30*	*1452.30*	1
25	**1756.4**	1756.40	**7808.50**	*7808.50*	*1756.40*	*1756.40*	*1756.40*	*1756.40*	25
50	**2061.1**	2061.10	**7899.80**	*7899.80*	*2061.10*	*2061.10*	*2061.10*	*2061.10*	26
75	**2352.7**	2352.70	**5096.70**	*5096.70*	*2352.70*	*2352.70*	*2352.70*	*2352.70*	50
100	**2630.9**	2630.90	**3009.90**	*3009.90*	*2630.90*	*2630.90*	*2630.90*	*2630.90*	75
117	**2761.4**	2761.40	**2075.10**	*2075.10*	*2761.40*	*2761.40*	*2761.40*	*2761.40*	100
125	**2743.7**	2743.70	**1544.60**	*1544.60*	*2743.70*	*2743.70*	*2743.70*	*2743.70*	125
150	**2603.3**	2603.30	**1210.60**	*1210.60*	*2603.30*	*2603.30*	*2603.30*	*2603.30*	150
175	**2359.1**	2359.10	**983.80**	*983.80*	*2359.10*	*2359.10*	*2359.10*	*2359.10*	175
200	**2125.9**	2125.90	**821.26**	*821.26*	*2125.90*	*2125.90*	*2125.90*	*2125.90*	200
225	**1924.9**	1924.90	**700.24**	*700.24*	*1924.90*	*1924.90*	*1924.90*	*1924.90*	225
250	**1753.7**	1753.70	**607.01**	*607.01*	*1753.70*	*1753.70*	*1753.70*	*1753.70*	250
275	**1609.3**	1609.30	**533.30**	*533.30*	*1609.30*	*1609.30*	*1609.30*	*1609.30*	275
300	**1484**	1484.00	**473.54**	*473.54*	*1484.00*	*1484.00*	*1484.00*	*1484.00*	300
Concentrations - Maximum 1-hr (ug/m3)									
Residential	2761.40	2761.40	7899.80	7899.80	2761.40	2761.40	2761.40	2761.40	
Daycare	0.00	0.00	473.54	473.54	0.00	0.00	0.00	0.00	
School	2125.90	2125.90	607.01	607.01	2125.90	2125.90	2125.90	2125.90	
Concentrations - Average Annual (ug/m3)									
Residential	276.14	276.14	789.98	789.98	276.14	276.14	276.14	276.14	
Daycare	0.00	0.00	47.35	47.35	0.00	0.00	0.00	0.00	
School	212.59	212.59	60.70	60.70	212.59	212.59	212.59	212.59	
SCALED Concentrations - Average Annual (ug/m3)									
Residential	0.54	0.10	0.93	0.29	0.55	0.12	0.51	0.14	
Daycare	0.00	0.00	0.06	0.02	0.00	0.00	0.00	0.00	
School	0.41	0.08	0.07	0.02	0.43	0.09	0.39	0.11	

ESTIMATED PM2.5 Concentrations - Maximum 1-hr (ug/m3)

Distance (m) Nursery	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	Distance (m) BB2
1	*1355.64*	*1432.31*	*4579.08*	*4807.98*	*1359.92*	*1433.92*	*1364.68*	*1424.08*	1
25	*1639.51*	*1732.23*	*7325.65*	*7691.85*	*1644.68*	*1734.17*	*1650.43*	*1722.27*	25
50	*1923.93*	*2032.74*	*7411.30*	*7781.78*	*1930.00*	*2035.01*	*1936.75*	*2021.05*	26
75	*2196.12*	*2320.32*	*4781.54*	*5020.56*	*2203.05*	*2322.92*	*2210.76*	*2306.98*	50
100	*2455.80*	*2594.69*	*2823.78*	*2964.93*	*2463.56*	*2597.60*	*2472.17*	*2579.78*	75
117	*2577.62*	*2723.40*	*1946.78*	*2044.10*	*2585.76*	*2726.45*	*2594.80*	*2707.74*	100
125	*2561.10*	*2705.94*	*1449.09*	*1521.52*	*2569.18*	*2708.97*	*2578.17*	*2690.38*	125
150	*2430.04*	*2567.47*	*1135.74*	*1192.51*	*2437.71*	*2570.35*	*2446.24*	*2552.71*	150
175	*2202.09*	*2326.64*	*922.96*	*969.10*	*2209.05*	*2329.24*	*2216.77*	*2313.26*	175
200	*1984.41*	*2096.64*	*770.48*	*808.99*	*1990.68*	*2098.99*	*1997.64*	*2084.59*	200
225	*1796.79*	*1898.41*	*656.94*	*689.78*	*1802.46*	*1900.54*	*1808.77*	*1887.49*	225
250	*1636.99*	*1729.57*	*569.47*	*597.94*	*1642.15*	*1731.50*	*1647.90*	*1719.62*	250
275	*1502.20*	*1587.15*	*500.32*	*525.33*	*1506.94*	*1588.93*	*1512.21*	*1578.03*	275
300	*1385.23*	*1463.58*	*444.26*	*466.47*	*1389.61*	*1465.22*	*1394.47*	*1455.16*	300
Concentrations - Maximum 1-hr (ug/m3)									
Residential	2577.62	2723.40	7411.30	7781.78	2585.76	2726.45	2594.80	2707.74	
Daycare	0.00	0.00	444.26	466.47	0.00	0.00	0.00	0.00	
School	1984.41	2096.64	569.47	597.94	1990.68	2098.99	1997.64	2084.59	
Concentrations - Average Annual (ug/m3)									
Residential	257.76	272.34	741.13	778.18	258.58	272.64	259.48	270.77	
Daycare	0.00	0.00	44.43	46.65	0.00	0.00	0.00	0.00	
School	198.44	209.66	56.95	59.79	199.07	209.90	199.76	208.46	
SCALED Concentrations - Average Annual (ug/m3)									
Residential	0.47	0.10	0.82	0.28	0.48	0.11	0.45	0.13	Green = used in results table
Daycare	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	
School	0.36	0.08	0.06	0.02	0.37	0.09	0.35	0.10	

Dose Calculation

	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	
Dose Factors									
Daily Breathing Rate (DBR) [L/kg-day or L/kg-8hrs]									
Residential									
3rd Trimester	361	*361*	*361*	*361*	*361*	*361*	*361*	*361*	Table 5.6, 95th percentile
Age 0<2 Years	1090	*1090*	*1090*	*1090*	*1090*	*1090*	*1090*	*1090*	Table 5.6, 95th percentile
Daycare									
Age 0<2 Years	1200	*1200*	*1200*	*1200*	*1200*	*1200*	*1200*	*1200*	Table 5.8, moderate intensity, 95th
School									
Age 2<9 Years	640	*640*	*640*	*640*	*640*	*640*	*640*	*640*	Table 5.8, moderate intensity, 95th
Inhalation Absorption Factor (A)	1	*1*	*1*	*1*	*1*	*1*	*1*	*1*	
Exposure Frequency (EF) [days/365 days]									
Residential	0.96	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	
Daycare	0.68	*0.68*	*0.68*	*0.68*	*0.68*	*0.68*	*0.68*	*0.68*	
School	0.49	*0.49*	*0.49*	*0.49*	*0.49*	*0.49*	*0.49*	*0.49*	
Conversion	0.000001	*0.000001*	*0.000001*	*0.000001*	*0.000001*	*0.000001*	*0.000001*	*0.000001*	
Dose Calculation									
Residential									
3rd Trimester	0.000186173	3.52704E-05	0.000322721	0.000100398	0.000191225	3.98882E-05	0.000177082	4.74505E-05	
Age 0<2 Years	0.000562128	0.000106495	0.000974419	0.000303142	0.000577382	0.000120438	0.000534679	0.000143272	
Total	0.0007483	0.000141765	0.00129714	0.00040354	0.000768607	0.000160326	0.000711761	0.000190722	
Daycare									
Age 0<2 Years	0	0	4.59318E-05	1.42894E-05	0	0	0	0	
Total	0	0	4.59318E-05	1.42894E-05	0	0	0	0	
School									
Age 2<9 Years	0.000130679	2.47572E-05	2.26091E-05	7.03369E-06	0.000134225	2.79985E-05	0.000124298	3.33067E-05	
Total	0.000130679	2.47572E-05	2.26091E-05	7.03369E-06	0.000134225	2.79985E-05	0.000124298	3.33067E-05	

Risk Calculation

	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated		
Risk Factors										
Inhalation Cancer Potency Factor (CPF)	1.1	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*	*1.1*		
Age Sensitivity Factor (ASF) [unitless]										
3rd Trimester	10	*10*	*10*	*10*	*10*	*10*	*10*	*10*		
Age 0<2 Years	10	*10*	*10*	*10*	*10*	*10*	*10*	*10*		
Age 2<9 Years	3	*3*	*3*	*3*	*3*	*3*	*3*	*3*		
Exposure Duration (ED) [years]										
Residential										
3rd Trimester	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		
Age 0<2 Years	0.31	0.31	0.03	0.03	0.38	0.38	0.18	0.18		
Daycare										
Age 0<2 Years	0.56	0.56	0.28	0.28	0.63	0.63	0.43	0.43		
School										
Age 2<9 Years	0.56	0.56	0.28	0.28	0.63	0.63	0.43	0.43		
Averaging Time (AT) [years]	70	70	70	70	70	70	70	70		
Fraction of Time at Home (FAH) [unitless]										
3rd Trimester	1	1	1	1	1	1	1	1	1	Fraction of time at home is set to 1.
Age 0<2 Years	1	1	1	1	1	1	1	1	1	
Age 2<9 Years	1	1	1	1	1	1	1	1	1	
Model Adjustment Factor (MAF) [unitless] - NOT USED - see note at top of page										
Residential	1	1	1	1	1	1	1	1		
Chances per Million	1,000,000	*1,000,000*	*1,000,000*	*1,000,000*	*1,000,000*	*1,000,000*	*1,000,000*	*1,000,000*		
Risk Calculation										
Residential										
3rd Trimester	7.31	1.39	12.68	3.94	7.51	1.57	6.96	1.86		
Age 0<2 Years	27.29	5.17	5.35	1.66	34.49	7.19	14.91	3.99		
Total	**34.60**	**6.56**	**18.03**	**5.61**	**42.00**	**8.76**	**21.86**	**5.86**	Green = used in results table	
Daycare										
Age 0<2 Years	0.00	0.00	2.06	0.64	0.00	0.00	0.00	0.00		
Total	**0.00**	**0.00**	**2.06**	**0.64**	**0.00**	**0.00**	**0.00**	**0.00**	2.69	
School										
Age 2<9 Years	3.44	0.65	0.30	0.09	3.99	0.83	2.50	0.67		
Total	**3.44**	**0.65**	**0.30**	**0.09**	**3.99**	**0.83**	**2.50**	**0.67**		
		-81%		-69%						
		#DIV/0!		-69%						
		-81%		-69%						

an one in a million.

San Anselmo Wind Rose (see below):
https://www.meteoblue.com/en/weather/forecast/modelclimate/san-anselmo_united-states-of-america_5391615

4.12.2.1 Non-Continuous Sources

4.12.2.2 Continuous Sources

1.5

2.1.3.2 Short Term Projects

Table 5.6 Point Estimates of Residential Daily Breathing Rates for 3rd trimester, 0<2, 2<9, 2<16, 16<30 and 16-70 years (L/kg BW-day)

Table 5.7 Daily Breathing Rate Distributions by Age Group for Residential Stochastic Analysis (L/kg BW-day)

Table 5.8 Eight-Hour Breathing Rate (L/kg per 8 Hrs) Point Estimates for Males and Females Combined

5-25

Table 8.4 Recommendations for Fraction of Time at Home (FAH) for Evaluating Residential Cancer Risk

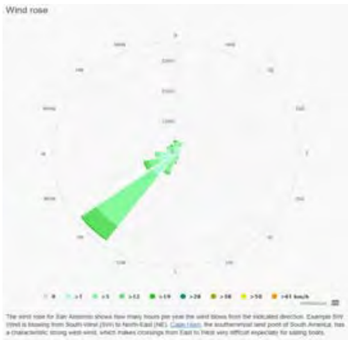
Chronic Hazard Index

Chronic REL (µg/m3) 5.0

California Air Resources Board, "Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values" and "OEHHA/ARB Approved Chronic Reference Exposure Levels and Target Organs," http://www.arb.ca.gov/toxics/healthval/healthval.htm.

Table last updated: February 23, 2017. Downloaded 10/9/17

Chronic Hazard Index	Nursery Unmitigated	Nursery Mitigated	BB2 Unmitigated	BB2 Mitigated	Nursery6 Unmitigated	Nursery6 Mitigated	Nursery7 Unmitigated	Nursery7 Mitigated	
Residential	0.11	0.02	0.19	0.06	0.11	0.02	0.10	0.03	Green = used in results table
Daycare	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
School	0.08	0.02	0.01	0.00	0.09	0.02	0.08	0.02	



8.3.1 Calculation of Noncancer Inhalation Hazard Quotient and Hazard Index

To calculate the acute HQ, the maximum 1-hour ground level concentration (in µg/m³) of a substance at a receptor is divided by the acute 1-hour REL (in µg/m³) for the substance:

$$\text{Acute Hazard Quotient} = \frac{\text{1-hour Max Concentration } (\mu g/m^3)}{\text{Acute REL } (\mu g/m^3)}$$

To calculate the chronic HQ, the annual average ground level concentration of a substance is divided by the chronic REL for the substance:

$$\text{Chronic Hazard Quotient} = \frac{\text{Annual Average Concentration } (\mu g/m^3)}{\text{Chronic REL } (\mu g/m^3)}$$

To calculate the 8-hour HQ, the adjusted annual average ground level concentration of a substance (represented as "Adjusted C_{air}" in EQ 5.4.1.4 A) is divided by the 8-hour REL for the substance:

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B-10 Constants

Constants

Updated: 4/11/2018

grams per ton	907185	
grams per MT	1000000	
grams per kg	1000	
lbs per ton	2000	
lbs per MT	2204.62	
hrs/day	24	
work hrs/day	10	*San Anselmo Flood Equipment & Work Durations R1*
seconds/hr	3600	
grams per lb	453.592	
kWh per MWh	1000	
1hr to annual concentration	0.1	https://www3.epa.gov/ttn/scram/models/screen/aerscreen_userguide.pdf
Days per year	365	

Renewable Diesel % reductions	Fuel, engine type RD, On-Road, FTP	B20 Soy, off-road	B100 Soy, off-road	**Source**
PM	-34.2%	-23.3%	-55.9%	On-Road: SF RD memo (Sachiko Tanikawa 2015) and Table ES-6: https://www.arb.ca.gov/fuels/diesel/altdiesel/20111013_CARB%20Final%20Biodiesel%20Report.pd
THC	-3.4%	-5.2%	-27.5%	Off-Road: Table ES-7: https://www.arb.ca.gov/fuels/diesel/altdiesel/20111013_CARB%20Final%20Biodiesel%20Report.pd
NOX	-9.9%	2.8%	13.8%	
CO2	-3.4%	1.2%	2.1%	
				SF RD memo for John Deere engine (Sachiko Tanikawa 2015) and https://www.arb.ca.gov/fuels/diesel/altdiesel/20111013_CARB%20Final%20Biodiesel%20Report.pdf, and https://www.arb.ca.gov/fuels/multimedia/meetings/RenewableDieselStaffReport_Nov2013.pc
Percent reduction for low-VOC Arch	0.1			

GWPs

CH4	28	IPCC AR4
N2O	265	IPCC AR4

GHG EFs from Climate Registry for Off-road equipment

CH4 (g/gal)	0.58	Table 13.7 , Construction/Mining Equipment - https://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pd
N2O (g/gal)	0.26	Table 13.7 , Construction/Mining Equipment - https://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pd
Ratio: CH4:CO2	0.00006	
Ratio: N2O:CO2	0.00003	
CO2 (kg/gal) - Diesel	10.21	Table 13.1 - https://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
CO2 (kg/gal) - Biodiesel (B100)	9.45	Table 13.1 - https://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
percent reduction biodiesel	7.4%	

CH4 and N2O from EMFAC

Gasoline - N2O per Nox	4.16%	https://www.arb.ca.gov/msei/emfac2011-faq.htm#emfac2011_web_db_qstn07
Diesel - gN2O per gallon	0.3316	https://www.arb.ca.gov/msei/emfac2011-faq.htm#emfac2011_web_db_qstn07

B-11 CalEEMod Output – Operational Emissions

San Anselmo Flood Control - Operational

Marin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	10.00	1000sqft	0.23	10,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 69

Climate Zone 5 **Operational Year** 2021

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - project modeling

Land Use -

Construction Phase - See AQ-GHG_calcs.xls. Assume all phases grading for simplicity.

Off-road Equipment - See AQ-GHG_calcs_v2.xls

Off-road Equipment - Information from PD and CH2M

Trips and VMT - Based on 10 workers (20 one-way trips per day) and 182 truck loads

On-road Fugitive Dust - See AQ-GHG_calcs_v2.xls

Grading - Information from PD and CH2M

Construction Off-road Equipment Mitigation - Assume all Tier 4 interim, per BAAQMD recommendations

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	5000	500
tblAreaCoating	Area_Nonresidential_Interior	15000	1500
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstEquipMitigation	Tier	No Change	Tier 4 Interim
tblConstructionPhase	NumDays	2.00	6.00
tblEnergyUse	LightingElect	3.58	3.67
tblEnergyUse	T24E	4.10	4.30
tblEnergyUse	T24NG	18.32	18.41
tblGrading	MaterialExported	0.00	1,600.00
tblOffRoadEquipment	HorsePower	212.00	245.00
tblOffRoadEquipment	HorsePower	158.00	266.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Sediment Removal
tblOffRoadEquipment	PhaseName		Sediment Removal
tblOnRoadDust	RoadSiltLoading	0.10	0.04
tblSolidWaste	SolidWasteGenerationRate	9.30	0.93
tblTripsAndVMT	HaulingTripNumber	158.00	182.00
tblTripsAndVMT	WorkerTripNumber	3.00	20.00
tblWater	IndoorWaterUseRate	1,777,337.48	177,733.75
tblWater	OutdoorWaterUseRate	1,089,335.87	108,933.59

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	2.2000e-003	0.0405	0.0175	1.1000e-004	4.5000e-004	5.1000e-004	9.5000e-004	3.3000e-004	4.7000e-004	8.0000e-004	0.0000	10.3809	10.3809	1.3500e-003	0.0000	10.4145
Maximum	**2.2000e-003**	**0.0405**	**0.0175**	**1.1000e-004**	**4.5000e-004**	**5.1000e-004**	**9.5000e-004**	**3.3000e-004**	**4.7000e-004**	**8.0000e-004**	**0.0000**	**10.3809**	**10.3809**	**1.3500e-003**	**0.0000**	**10.4145**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	1.6500e-003	0.0373	0.0274	1.1000e-004	1.1200e-003	1.7000e-004	1.3000e-003	3.3000e-004	1.7000e-004	5.0000e-004	0.0000	10.3809	10.3809	1.3500e-003	0.0000	10.4145
Maximum	**1.6500e-003**	**0.0373**	**0.0274**	**1.1000e-004**	**1.1200e-003**	**1.7000e-004**	**1.3000e-003**	**3.3000e-004**	**1.7000e-004**	**5.0000e-004**	**0.0000**	**10.3809**	**10.3809**	**1.3500e-003**	**0.0000**	**10.4145**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**25.00**	**8.07**	**-56.87**	**0.00**	**-148.89**	**66.67**	**-36.84**	**0.00**	**63.83**	**37.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**1-1-2019**	**3-31-2019**	0.0409	0.0372
		Highest	0.0409	0.0372

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0396	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	47.5127	47.5127	1.8800e-003	5.4000e-004	47.7198
Mobile	0.0224	0.0750	0.2502	8.2000e-004	0.0742	8.6000e-004	0.0750	0.0199	8.1000e-004	0.0207	0.0000	74.7320	74.7320	2.5800e-003	0.0000	74.7966
Waste						0.0000	0.0000		0.0000	0.0000	0.1888	0.0000	0.1888	0.0112	0.0000	0.4677
Water						0.0000	0.0000		0.0000	0.0000	0.0564	0.3907	0.4471	5.8100e-003	1.4000e-004	0.6341
Total	**0.0630**	**0.0845**	**0.2583**	**8.8000e-004**	**0.0742**	**1.5800e-003**	**0.0757**	**0.0199**	**1.5300e-003**	**0.0214**	**0.2452**	**122.6355**	**122.8807**	**0.0214**	**6.8000e-004**	**123.6185**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0396	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004
Energy	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	47.5127	47.5127	1.8800e-003	5.4000e-004	47.7198
Mobile	0.0224	0.0750	0.2502	8.2000e-004	0.0742	8.6000e-004	0.0750	0.0199	8.1000e-004	0.0207	0.0000	74.7320	74.7320	2.5800e-003	0.0000	74.7966
Waste						0.0000	0.0000		0.0000	0.0000	0.1888	0.0000	0.1888	0.0112	0.0000	0.4677
Water						0.0000	0.0000		0.0000	0.0000	0.0564	0.3907	0.4471	5.8100e-003	1.4000e-004	0.6341
Total	**0.0630**	**0.0845**	**0.2583**	**8.8000e-004**	**0.0742**	**1.5800e-003**	**0.0757**	**0.0199**	**1.5300e-003**	**0.0214**	**0.2452**	**122.6355**	**122.8807**	**0.0214**	**6.8000e-004**	**123.6185**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Sediment Removal	Grading	1/1/2019	1/8/2019	5	6	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sediment Removal	Concrete/Industrial Saws	0	8.00	81	0.73
Sediment Removal	Crawler Tractors	0	10.00	245	0.43
Sediment Removal	Excavators	1	10.00	266	0.38
Sediment Removal	Rubber Tired Dozers	0	1.00	247	0.40
Sediment Removal	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sediment Removal	1	20.00	0.00	182.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Sediment Removal - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0800e-003	0.0119	7.4400e-003	3.0000e-005		3.9000e-004	3.9000e-004		3.6000e-004	3.6000e-004	0.0000	2.9186	2.9186	9.2000e-004	0.0000	2.9417
Total	**1.0800e-003**	**0.0119**	**7.4400e-003**	**3.0000e-005**	**0.0000**	**3.9000e-004**	**3.9000e-004**	**0.0000**	**3.6000e-004**	**3.6000e-004**	**0.0000**	**2.9186**	**2.9186**	**9.2000e-004**	**0.0000**	**2.9417**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.9000e-004	0.0285	8.4300e-003	7.0000e-005	3.8000e-004	1.2000e-004	5.0000e-004	2.6000e-004	1.1000e-004	3.7000e-004	0.0000	7.0271	7.0271	4.1000e-004	0.0000	7.0374
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.6000e-004	1.5800e-003	0.0000	6.0000e-005	0.0000	7.0000e-005	7.0000e-005	0.0000	7.0000e-005	0.0000	0.4352	0.4352	1.0000e-005	0.0000	0.4355
Total	**1.1200e-003**	**0.0286**	**0.0100**	**7.0000e-005**	**4.4000e-004**	**1.2000e-004**	**5.7000e-004**	**3.3000e-004**	**1.1000e-004**	**4.4000e-004**	**0.0000**	**7.4623**	**7.4623**	**4.2000e-004**	**0.0000**	**7.4729**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.3000e-004	8.6200e-003	0.0174	3.0000e-005		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	2.9186	2.9186	9.2000e-004	0.0000	2.9417
Total	**5.3000e-004**	**8.6200e-003**	**0.0174**	**3.0000e-005**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**5.0000e-005**	**0.0000**	**2.9186**	**2.9186**	**9.2000e-004**	**0.0000**	**2.9417**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.9000e-004	0.0285	8.4300e-003	7.0000e-005	8.8000e-004	1.2000e-004	1.0000e-003	2.6000e-004	1.1000e-004	3.7000e-004	0.0000	7.0271	7.0271	4.1000e-004	0.0000	7.0374
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.6000e-004	1.5800e-003	0.0000	2.4000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.4352	0.4352	1.0000e-005	0.0000	0.4355
Total	**1.1200e-003**	**0.0286**	**0.0100**	**7.0000e-005**	**1.1200e-003**	**1.2000e-004**	**1.2500e-003**	**3.3000e-004**	**1.1000e-004**	**4.4000e-004**	**0.0000**	**7.4623**	**7.4623**	**4.2000e-004**	**0.0000**	**7.4729**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.0224	0.0750	0.2502	8.2000e-004	0.0742	8.6000e-004	0.0750	0.0199	8.1000e-004	0.0207	0.0000	74.7320	74.7320	2.5800e-003	0.0000	74.7966
Unmitigated	0.0224	0.0750	0.2502	8.2000e-004	0.0742	8.6000e-004	0.0750	0.0199	8.1000e-004	0.0207	0.0000	74.7320	74.7320	2.5800e-003	0.0000	74.7966

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	110.30	24.60	10.50	200,261	200,261
Total	110.30	24.60	10.50	200,261	200,261

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.589733	0.041719	0.200019	0.112200	0.017267	0.005142	0.010289	0.010866	0.002023	0.003460	0.005838	0.000685	0.000758

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	37.1494	37.1494	1.6800e-003	3.5000e-004	37.2950
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	37.1494	37.1494	1.6800e-003	3.5000e-004	37.2950
NaturalGas Mitigated	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3633	10.3633	2.0000e-004	1.9000e-004	10.4248
NaturalGas Unmitigated	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3633	10.3633	2.0000e-004	1.9000e-004	10.4248

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
General Office Building	194200	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3633	10.3633	2.0000e-004	1.9000e-004	10.4248
Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**	**0.0000**	**10.3633**	**10.3633**	**2.0000e-004**	**1.9000e-004**	**10.4248**

Mitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
General Office Building	194200	1.0500e-003	9.5200e-003	8.0000e-003	6.0000e-005		7.2000e-004	7.2000e-004		7.2000e-004	7.2000e-004	0.0000	10.3633	10.3633	2.0000e-004	1.9000e-004	10.4248

Total		**1.0500e-003**	**9.5200e-003**	**8.0000e-003**	**6.0000e-005**		**7.2000e-004**	**7.2000e-004**		**7.2000e-004**	**7.2000e-004**	**0.0000**	**10.3633**	**10.3633**	**2.0000e-004**	**1.9000e-004**	**10.4248**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	127700	37.1494	1.6800e-003	3.5000e-004	37.2950
Total		**37.1494**	**1.6800e-003**	**3.5000e-004**	**37.2950**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	127700	37.1494	1.6800e-003	3.5000e-004	37.2950
Total		**37.1494**	**1.6800e-003**	**3.5000e-004**	**37.2950**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0396	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004
Unmitigated	0.0396	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	5.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0391					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004
Total	**0.0396**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.0000**	**1.9000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	5.2000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0391					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.8000e-004	1.8000e-004	0.0000	0.0000	1.9000e-004
Total	**0.0396**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.0000**	**1.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.4471	5.8100e-003	1.4000e-004	0.6341
Unmitigated	0.4471	5.8100e-003	1.4000e-004	0.6341

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
General Office Building	0.177734 / 0.108934	0.4471	5.8100e-003	1.4000e-004	0.6341
Total		**0.4471**	**5.8100e-003**	**1.4000e-004**	**0.6341**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	0.177734 / 0.108934	0.4471	5.8100e-003	1.4000e-004	0.6341
Total		**0.4471**	**5.8100e-003**	**1.4000e-004**	**0.6341**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.1888	0.0112	0.0000	0.4677

Unmitigated	0.1888	0.0112	0.0000	0.4677

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	0.93	0.1888	0.0112	0.0000	0.4677
Total		**0.1888**	**0.0112**	**0.0000**	**0.4677**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Office Building	0.93	0.1888	0.0112	0.0000	0.4677
Total		**0.1888**	**0.0112**	**0.0000**	**0.4677**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

B-12 AERSCREEN Inputs – Sunnyside Nursery Site Basin

Nursery

Start date and time 04/04/18 14:01:38
AERSCREEN 16216

BB2

BB2

```
        -----------------  DATA ENTRY VALIDATION  -----------------
                       METRIC             ENGLISH
 ** AREADATA **  ---------------     ----------------

 Emission Rate:       1.0000 g/s            7.937 lb/hr
 Area Height:           3.89 meters         12.76 feet
 Area Source Length:  185.00 meters        606.96 feet
 Area Source Width:   150.00 meters        492.13 feet
 Vertical Dimension:    1.40 meters          4.59 feet
 Model Mode:           RURAL
 Dist to Ambient Air:           1.0 meters            3. feet


 ** BUILDING DATA **

 No Building Downwash Parameters


 ** TERRAIN DATA **

 No Terrain Elevations
 Source Base Elevation:   0.0 meters        0.0  feet

 Probe distance:   5000. meters       16404. feet
 Flagpole Receptor Height:      1.5 meters            5. feet

 No discrete receptors used


 ** FUMIGATION DATA **

 No fumigation requested


 ** METEOROLOGY DATA **

 Min/Max Temperature:  278.0 / 303.0 K   40.7 /  85.7 Deg F

 Minimum Wind Speed:     0.5 m/s

 Anemometer Height:   10.000 meters

 Dominant Surface Profile: Urban
 Dominant Climate Type:    Average Moisture

 Surface friction velocity (u*): not adjusted

DEBUG OPTION OFF


 AERSCREEN output file:
 Nursery.Out


 *** AERSCREEN Run is Ready to Begin


 No terrain used, AERMAP will not be run
**************************************************
```

```
SURFACE CHARACTERISTICS & MAKEMET
Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture
Season            Albedo     Bo       zo
Winter             0.35     1.50     1.000
Spring             0.14     1.00     1.000
Summer             0.16     2.00     1.000
Autumn             0.18     2.00     1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR   started 04/04/18 14:04:00
 ********************************************

  Running AERMOD
 Processing Winter

Processing surface roughness sector  1

*****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

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

```
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************

  Running AERMOD
 Processing Spring

Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

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

```
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************

  Running AERMOD
 Processing Summer

Processing surface roughness sector  1

*****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

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

```
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************

  Running AERMOD
 Processing Autumn

Processing surface roughness sector  1

*****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

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

```
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 04/04/18 14:04:41

REFINE       started 04/04/18 14:04:41

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 04/04/18 14:04:44

 ***********************************************
 AERSCREEN Finished Successfully
 With no errors or warnings
 Check log file for details
```

****

Ending date and time 04/04/18 14:04:45

B-13 AERSCREEN Inputs – Downtown San Anselmo Site

```
Start date and time  04/04/18 14:11:57
                             AERSCREEN 16216

BB2

            BB2


         -----------------  DATA ENTRY VALIDATION  -----------------
                        METRIC              ENGLISH
 ** AREADATA **  ---------------     ----------------

 Emission Rate:       1.0000 g/s             7.937 lb/hr
 Area Height:           3.89 meters          12.76 feet
 Area Source Length:   50.00 meters         164.04 feet
 Area Source Width:    40.00 meters         131.23 feet
 Vertical Dimension:    1.40 meters           4.59 feet
 Model Mode:           URBAN
 Population:           12599
 Dist to Ambient Air:           1.0 meters             3. feet


 ** BUILDING DATA **

 No Building Downwash Parameters


 ** TERRAIN DATA **

 No Terrain Elevations
 Source Base Elevation:   0.0 meters        0.0  feet

 Probe distance:   5000. meters       16404. feet
 Flagpole Receptor Height:      1.5 meters             5. feet

 No discrete receptors used


 ** FUMIGATION DATA **

 No fumigation requested


 ** METEOROLOGY DATA **

 Min/Max Temperature:  278.0 / 303.0 K   40.7 /  85.7 Deg F

 Minimum Wind Speed:     0.5 m/s

 Anemometer Height:   10.000 meters

 Dominant Surface Profile: Urban
 Dominant Climate Type:    Average Moisture

 Surface friction velocity (u*): not adjusted

DEBUG OPTION OFF


 AERSCREEN output file:
 BB2.out


 *** AERSCREEN Run is Ready to Begin



 No terrain used, AERMAP will not be run
```

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

SURFACE CHARACTERISTICS & MAKEMET
Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture
Season            Albedo     Bo       zo
Winter              0.35     1.50     1.000
Spring              0.14     1.00     1.000
Summer              0.16     2.00     1.000
Autumn              0.18     2.00     1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR   started 04/04/18 14:12:42
 *******************************************

  Running AERMOD
 Processing Winter

Processing surface roughness sector  1

*****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP

*****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP

*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP
```

```
****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
 ********************************************

  Running AERMOD
 Processing Spring

Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
```

```
****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
 ********************************************

  Running AERMOD
 Processing Summer

Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
```

```
****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
 ********************************************

  Running AERMOD
 Processing Autumn

Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP
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Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

*****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

FLOWSECTOR   ended 04/04/18 14:13:02

REFINE       started 04/04/18 14:13:02

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
 CO W320      36       URBOPT: Input Parameter May Be Out-of-Range for Parameter      URB-POP

REFINE       ended 04/04/18 14:13:04

 **********************************************
 AERSCREEN Finished Successfully
 But with Warnings
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Check log file for details
****

Ending date and time 04/04/18 14:13:05

B-14 AERSCREEN Outputs – Sunnyside Nursery Site Basin

Nursery_max_conc_distance

Concentration	Distance	Elevation	Diag	Season/Month	Zo sector	Date	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	HT	REF TA	HT
0.14523E+04	1.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.17564E+04	25.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.20611E+04	50.00	0.00	30.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.23527E+04	75.00	0.00	20.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.26309E+04	100.00	0.00	20.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
* 0.27614E+04	117.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.27437E+04	125.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.26033E+04	150.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.23591E+04	175.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.21259E+04	200.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.19249E+04	225.00	0.00	35.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.17537E+04	250.00	0.00	30.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.16093E+04	275.00	0.00	30.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14840E+04	300.00	0.00	25.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13764E+04	325.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12818E+04	350.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11965E+04	375.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11198E+04	400.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10511E+04	425.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.98814E+03	450.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.93174E+03	475.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.88028E+03	500.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.83333E+03	525.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.79022E+03	550.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.75075E+03	575.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.71502E+03	600.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.68129E+03	625.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.65060E+03	650.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.62182E+03	675.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.59553E+03	700.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.57093E+03	725.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.54786E+03	750.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.52639E+03	775.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.50634E+03	800.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.48760E+03	825.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.47009E+03	850.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.45347E+03	875.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.43789E+03	900.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.42327E+03	925.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.40938E+03	950.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.39625E+03	975.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.38386E+03	1000.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.37216E+03	1025.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.36101E+03	1050.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.35035E+03	1075.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.34031E+03	1100.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.33071E+03	1125.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.32155E+03	1150.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.31285E+03	1175.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.30459E+03	1200.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.29671E+03	1225.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.28911E+03	1250.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.28186E+03	1275.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.27492E+03	1300.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.26828E+03	1325.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.26187E+03	1350.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.25570E+03	1375.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.24979E+03	1400.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.24415E+03	1425.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.23871E+03	1450.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.23347E+03	1475.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.22843E+03	1500.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.22359E+03	1525.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.21891E+03	1550.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.21439E+03	1575.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.21004E+03	1600.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.20586E+03	1625.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.20183E+03	1650.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.19793E+03	1675.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.19417E+03	1700.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.19050E+03	1725.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.18695E+03	1750.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.18351E+03	1775.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.18019E+03	1800.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.17694E+03	1825.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.17379E+03	1850.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.17073E+03	1875.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.16776E+03	1900.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.16489E+03	1924.99	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.16211E+03	1950.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.15940E+03	1975.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.15679E+03	2000.01	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.15425E+03	2025.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.15179E+03	2050.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14939E+03	2075.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14703E+03	2100.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14474E+03	2125.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14252E+03	2150.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.14035E+03	2175.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13824E+03	2200.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13618E+03	2225.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13417E+03	2250.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13222E+03	2275.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.13033E+03	2300.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12848E+03	2325.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12668E+03	2350.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12491E+03	2375.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12319E+03	2400.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.12151E+03	2425.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11987E+03	2450.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11828E+03	2475.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11672E+03	2500.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11519E+03	2525.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11370E+03	2550.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11225E+03	2575.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.11082E+03	2600.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10942E+03	2625.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10806E+03	2650.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10671E+03	2675.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0

0.10540E+03	2700.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10411E+03	2725.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10285E+03	2750.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10161E+03	2775.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.10040E+03	2800.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.99214E+02	2825.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.98051E+02	2850.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.96915E+02	2875.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.95803E+02	2900.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.94712E+02	2925.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.93640E+02	2950.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.92589E+02	2975.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.91558E+02	3000.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.90554E+02	3025.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.89567E+02	3050.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.88599E+02	3075.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.87648E+02	3100.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.86714E+02	3125.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.85798E+02	3150.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.84903E+02	3175.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.84024E+02	3200.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.83159E+02	3225.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.82308E+02	3250.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.81470E+02	3275.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.80645E+02	3300.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.79834E+02	3325.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.79037E+02	3350.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.78254E+02	3375.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.77484E+02	3400.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.76726E+02	3425.01	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.75981E+02	3450.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.75248E+02	3475.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.74527E+02	3500.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.73818E+02	3525.00	0.00	15.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.73122E+02	3550.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.72439E+02	3575.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.71768E+02	3600.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.71106E+02	3625.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.70456E+02	3650.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.69816E+02	3675.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.69186E+02	3700.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.68566E+02	3725.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.67956E+02	3750.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.67353E+02	3775.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.66760E+02	3800.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.66176E+02	3825.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.65601E+02	3850.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.65034E+02	3875.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.64476E+02	3900.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.63924E+02	3925.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.63381E+02	3950.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.62846E+02	3975.00	0.00	10.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.62321E+02	4000.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.61804E+02	4025.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.61295E+02	4050.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.60793E+02	4075.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.60298E+02	4100.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.60303E+02	4125.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.59812E+02	4150.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.59328E+02	4175.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.58851E+02	4200.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.58381E+02	4225.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.57916E+02	4250.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.57459E+02	4275.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.57007E+02	4300.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.56562E+02	4325.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.56123E+02	4350.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.55689E+02	4375.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.55261E+02	4400.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.54839E+02	4425.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.54423E+02	4450.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.54012E+02	4475.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.53606E+02	4500.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.53206E+02	4525.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.52811E+02	4550.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.52421E+02	4575.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.52035E+02	4600.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.51655E+02	4625.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.51280E+02	4650.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.50909E+02	4675.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.50543E+02	4700.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.50181E+02	4725.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.49824E+02	4750.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.49471E+02	4775.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.49123E+02	4800.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.48779E+02	4825.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.48439E+02	4850.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.48103E+02	4875.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.47771E+02	4900.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.47443E+02	4925.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.47119E+02	4950.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.46799E+02	4975.00	0.00	0.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0
0.46482E+02	5000.00	0.00	5.0	Winter	0-360	10010101	-1.23	0.043	-9.000	0.020	-999.	21.	5.7	1.000	1.50	0.35	0.50	10.0	278.0	2.0

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B-15 AERSCREEN Outputs – Downtown San Anselmo Site

Concentration	Distance	Elevation	Diag	Season/Month	Zo sector	Date	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	HT	REF TA	HT
0.48809E+04	1.00	0.00	30.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.78085E+04	25.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
* 0.78998E+04	26.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.50967E+04	50.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.30099E+04	75.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20751E+04	100.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15446E+04	125.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12106E+04	150.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.98380E+03	175.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.82126E+03	200.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.70024E+03	225.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.60701E+03	250.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.53330E+03	275.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.47354E+03	300.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.42461E+03	325.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.38374E+03	350.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.34935E+03	375.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.31998E+03	400.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.29455E+03	425.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.27238E+03	450.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.25300E+03	475.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.23592E+03	500.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.22069E+03	525.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20709E+03	550.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19490E+03	575.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18388E+03	600.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17393E+03	625.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16488E+03	650.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15663E+03	675.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14996E+03	700.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14290E+03	725.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13639E+03	750.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13038E+03	775.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12482E+03	800.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.11965E+03	825.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.11484E+03	850.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.11036E+03	875.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.10617E+03	900.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.10225E+03	925.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.98577E+02	950.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.95124E+02	975.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.91876E+02	1000.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.88815E+02	1025.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.85927E+02	1050.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.83197E+02	1075.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.80614E+02	1100.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.78167E+02	1125.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.75846E+02	1149.99	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.73641E+02	1175.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.71546E+02	1200.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.69551E+02	1224.99	0.00	40.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.67651E+02	1249.99	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.65839E+02	1275.00	0.00	30.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.64110E+02	1300.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.62457E+02	1325.00	0.00	30.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.60878E+02	1350.00	0.00	30.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.59366E+02	1375.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.57918E+02	1400.00	0.00	40.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.56530E+02	1425.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.55199E+02	1450.00	0.00	40.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.53921E+02	1475.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.52693E+02	1500.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.51513E+02	1525.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.50378E+02	1550.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.49286E+02	1574.99	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.48234E+02	1600.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.47221E+02	1625.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.46244E+02	1650.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.45301E+02	1675.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.44391E+02	1700.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.43512E+02	1725.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.42663E+02	1750.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.41842E+02	1775.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.41049E+02	1800.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.40281E+02	1824.99	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.39537E+02	1850.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.38817E+02	1875.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.38120E+02	1900.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.37444E+02	1924.99	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.36788E+02	1950.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.36152E+02	1975.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.35535E+02	2000.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.34936E+02	2025.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.34354E+02	2050.00	0.00	30.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.33788E+02	2075.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.33239E+02	2100.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.32705E+02	2125.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.32186E+02	2150.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.31680E+02	2175.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.31189E+02	2200.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.30710E+02	2225.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.30244E+02	2250.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.29790E+02	2275.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.29348E+02	2300.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.28917E+02	2325.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.28497E+02	2350.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.28087E+02	2375.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.27688E+02	2399.99	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.27298E+02	2425.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.26917E+02	2450.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.26546E+02	2475.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.26184E+02	2500.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.25829E+02	2525.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.25484E+02	2550.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.25146E+02	2575.00	0.00	25.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.24816E+02	2600.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.24493E+02	2625.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.24177E+02	2650.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.23869E+02	2675.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0

0.23567E+02	2700.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.23271E+02	2725.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.22983E+02	2750.00	0.00	20.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.22700E+02	2775.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.22423E+02	2800.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.22152E+02	2825.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.21887E+02	2850.00	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.21627E+02	2875.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.21372E+02	2900.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.21123E+02	2925.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20878E+02	2950.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20639E+02	2975.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20404E+02	3000.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.20174E+02	3025.00	0.00	40.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19948E+02	3050.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19726E+02	3075.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19509E+02	3100.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19296E+02	3125.00	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.19087E+02	3150.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18881E+02	3175.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18680E+02	3199.99	0.00	10.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18482E+02	3225.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18288E+02	3249.99	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.18097E+02	3275.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17910E+02	3300.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17726E+02	3325.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17546E+02	3350.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17368E+02	3375.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17194E+02	3400.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.17022E+02	3425.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16854E+02	3450.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16688E+02	3475.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16525E+02	3500.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16365E+02	3525.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16208E+02	3550.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.16053E+02	3575.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15901E+02	3600.00	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15751E+02	3625.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15604E+02	3650.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15459E+02	3675.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15316E+02	3700.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15176E+02	3725.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.15038E+02	3750.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14902E+02	3775.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14768E+02	3800.00	0.00	40.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14636E+02	3825.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14506E+02	3849.99	0.00	15.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14379E+02	3875.00	0.00	5.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14253E+02	3900.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14129E+02	3925.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.14007E+02	3950.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13886E+02	3975.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13768E+02	4000.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13651E+02	4025.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13536E+02	4050.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13423E+02	4074.99	0.00	35.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13311E+02	4100.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13201E+02	4125.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.13092E+02	4150.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12985E+02	4175.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12879E+02	4200.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12775E+02	4225.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12673E+02	4250.00	0.00	0.0	Winter	0-360	10011001	-1.28	0.043	-9.000	0.020	-999.	21.	5.9	1.000	1.50	0.35	0.50	10.0	303.0	2.0
0.12595E+02	4275.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12543E+02	4300.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12492E+02	4325.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12442E+02	4350.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12392E+02	4375.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12342E+02	4400.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12293E+02	4425.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12245E+02	4450.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12197E+02	4475.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12149E+02	4500.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12102E+02	4525.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12055E+02	4550.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.12009E+02	4575.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11963E+02	4600.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11918E+02	4625.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11873E+02	4650.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11828E+02	4675.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11784E+02	4700.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11740E+02	4725.00	0.00	25.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11697E+02	4750.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11654E+02	4775.00	0.00	30.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11611E+02	4800.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11569E+02	4825.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11527E+02	4850.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11486E+02	4875.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11445E+02	4900.00	0.00	5.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11404E+02	4925.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11363E+02	4950.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11323E+02	4975.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0
0.11283E+02	5000.00	0.00	0.0	Summer	0-360	10010312	8.25	0.121	0.300	0.020	117.	96.	-19.0	1.000	2.00	0.16	0.50	10.0	290.5	2.0

APPENDIX C

Hazards and Hazardous Materials Supporting Documentation

Hazardous Building Materials Survey

630, 634, and 636 San Anselmo Avenue
San Anselmo, California

County of Marin

3501 Civic Center Drive, Room 304 |San Rafael, California 94903

November 16, 2017 | Project No. 403163001

Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Hazardous Building Materials Survey

630, 634, and 636 San Anselmo Avenue
San Anselmo, California

Mr. Russell Eberwein, Senior Civil Engineer
Marin County Department of Public Works
3501 Civic Center Drive, Room 304 |San Rafael, California 94903

November 16, 2017 | Project No. 403163001

David Blair Bridges, CAC 14-5173
Project Geologist

Duane Blamer, PG 6913
Principal Geologist
Manager, Environmental Sciences

DBB/DWB/vmn

Distribution: (1) Addressee (via e-mail)

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1 INTRODUCTION

Ninyo & Moore was retained by the County of Marin to conduct hazardous building materials surveys (HBMSs) at 630, 634, and 636 San Anselmo Avenue, located in San Anselmo, California (Figure 1). Our services included the performance of asbestos-containing materials (ACM) surveys, lead-containing materials (LCM) surveys, and a review and quantification of miscellaneous hazardous building materials (potential mercury-containing thermostats/switches, poly chlorinated biphenyl (PCB)-containing items [transformers, light ballasts, etc.], fluorescent light tubes, exit signs, air conditioning units, and Freon™-containing refrigeration systems) at the three site buildings. For the purposes of this assessment, LCM refers to both lead-based paint (LBP), as defined by the California Department of Public Health (CDPH) and U.S. Department of Housing and Urban Development (HUD) and other potential LCMs (including ceramic tile).

The survey was performed in accordance with established guidelines for the assessment of ACM and LCM, and is based upon conditions of the site buildings at the time of the surveying/assessment activities. Our objective and scope of work for the survey are presented below.

1.1 Involved Parties

Mr. Blair Bridges of Ninyo & Moore conducted the HBMS sampling activities on November 2, 2017. Mr. Bridges is a State of California Division of Occupational Safety and Health (DOSH)-Certified Asbestos Consultant (No. 14-5173) and California Department of Public Health (DPH) Lead-related Construction Services Inspector/Assessor (No. 24052). Mr. Duane Blamer of Ninyo & Moore provided quality assurance and principal-level management for this project. Professional certifications are presented in Appendix A.

1.2 User Reliance

This report may be relied upon and is intended exclusively for use by the County of Marin. Any use or re-use of the findings, conclusions, and/or recommendations of this report by parties other than the Client is undertaken at said parties' sole risk.

2 OBJECTIVE AND SCOPE OF SERVICES

The purpose of this study is to provide information regarding the current site conditions to assist the County of Marin in implementing proposed site building demolition activities. Ninyo & Moore personnel performed the following services:

- Conducted a visual reconnaissance of the site buildings to document homogeneous areas of hazardous building materials and locate suspect ACM and LCMs.
- Collected 54 bulk samples of suspect ACMs and submitted them to a certified, independent laboratory for analysis of asbestos content.
- Collected 18 suspect LCM samples and submitted these samples to a certified, independent laboratory for analysis of lead content.
- Visually assessed and quantified potential mercury-containing thermostats/switches, PCB-containing items, fluorescent light tubes, exit signs, smoke detectors, air conditioning units, and FreonTM-containing refrigeration systems.
- Prepared this HBMS report, which presents our data and summarizes the assessed building materials. The report includes a site description, laboratory testing information, findings, conclusions, and recommendations, sample location maps, tables summarizing the building materials assessed, and the estimated quantities of identified materials.

3 SITE DESCRIPTION

The three buildings are located in the City of San Anselmo and are indicated on Figures 1 and 2. Descriptions of each of the site buildings are provided below.

636 San Anselmo Avenue: this building is an approximately 1,600 square-foot building with a kitchen, a dining area, storage rooms, and bathrooms. Building finishes include gypsum wallboard walls, vinyl floor sheeting (VFS), ceramic tile and painted concrete floors, and wood exterior walls.

634 San Anselmo Avenue: this building is an approximately 1,500 square-foot building including a real estate office (and bathroom), an optometrists office (and bathroom), and a barber shop. Building finishes include gypsum wallboard walls, ceramic tile floors, carpeted and wood floors, and exterior wood walls.

630 San Anselmo Avenue: this building is an approximately 140 square-foot building with CMU interior/exterior walls and a painted concrete floor.

4 PHYSICAL LIMITATIONS

No physical limitations were encountered during the site visit.

Underground utilities, such as suspect cementitious water lines or suspect insulated/coated gas or electrical lines were not assessed during these survey activities. If additional suspect materials and/or surfaces are encountered during the site building demolitions that have not been assessed, they should be assumed to be asbestos and/or lead-containing and handled accordingly, or should be sampled and analyzed to assess whether they are asbestos and/or lead-containing. As-built diagrams of the site buildings were not provided for review.

5 SAMPLE COLLECTION AND ANALYSES

On November 2, 2017, the site buildings were assessed for the presence of ACMs, LCMs, and miscellaneous hazardous building materials. The ACM and LCM surveys followed United States Environmental Protection Agency (EPA) guidelines, or industry standards, within the limitations of the scope of this assessment. Survey activities are discussed below.

5.1 Asbestos Survey

A preliminary visual assessment and bulk sampling survey of suspect ACMs were performed by a State of California Certified Asbestos Consultant. Representative samples of suspect ACMs were collected after identification of homogeneous sampling areas (areas in which the materials are consistent in color, texture, construction or application date, and general appearance). Each homogeneous area was observed for material type, location, condition, and friability. Representative samples were collected from each area (except from areas that were inaccessible). Samples were collected using USEPA-recommended sampling procedures.

A total of 54 bulk suspect asbestos samples were collected and analyzed. Building materials that were sampled and analyzed for the presence of asbestos are presented in Table 1.

After collection, the suspect ACM samples were transferred to EMSL Analytical, Inc., (EMSL) of San Leandro, California for analysis. EMSL is a laboratory accredited in the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk asbestos fiber analysis. The samples were analyzed for the presence and quantification of asbestos fibers, using polarized light microscopy with dispersion staining (PLM/ds), in general accordance with USEPA Method 600/R-93/116. The lower limit of reliable detection for asbestos using the PLM method is approximately 1 percent by volume. Currently, the EPA and the State of California stipulate that materials containing more than 1% asbestos constitute an ACM and the State of California stipulates that a material containing greater than 0.1% asbestos constitutes an asbestos-containing construction material (ACCM). Building materials that were sampled and analyzed for the presence of asbestos are presented in the attached Table 1, and the locations from which bulk asbestos samples were collected are shown on Figures 3 and 4. Materials in which no asbestos was detected are defined in Table 1 as "ND" (for "None Detected") in the "Asbestos Detected" column. Copies of the laboratory analytical reports and chain-of-custody records for suspect ACMs are presented in Appendix B. ACMs reported in the Ninyo & Moore survey are listed in Section 6.1 below.

5.2 Lead-Containing Materials Survey

After collection, the suspect LCM samples were also transferred to EMSL for analysis of total lead content by Flame Atomic Absorption Spectrometry (Flame AAS/SW 846 3050B/7000B).

EMSL is an American Industrial Hygiene Association accredited Environmental Lead Laboratory (AIHA ELLA). Currently, the USEPA stipulates what concentrations of lead in non-volatile components of surface coatings or materials indicate whether a material is considered to be lead-containing. The USEPA stipulates that paint containing an amount equal to or in excess of 1 milligram per square centimeter (1.0 mg/cm^2), or more than half of one percent (0.5%) by weight (or 5,000 milligrams per kilogram [mg/kg]), constitute a lead-based paint (LBP). Coatings with any detectable amount of reported lead would be considered lead-containing paint (LCP).

Paint that is chipping or peeling, or that may be readily removed from surfaces, and has a lead content equal to or more than 1,000 mg/kg, would require handling as a California Title 22 hazardous waste. The analytical results associated with paint chip samples collected from the building are summarized in Table 2 and copies of the laboratory analytical report and chain-of-custody record are presented in Appendix C.

5.3 Miscellaneous Hazardous Building Materials Survey

Confirmation of miscellaneous hazardous building materials, via analytical testing, was not performed for this survey. Potentially hazardous miscellaneous building materials observed and quantified at the site buildings are presented in Table 3.

A visual assessment and quantification was performed of potential mercury-containing thermostats/switches, PCB-containing items (transformers, light ballasts, etc.), fluorescent light tubes, exit signs, smoke detectors, air conditioning units, and Freon™-containing refrigeration systems.

6 FINDINGS

HBMSs were performed at the site buildings to evaluate if potential hazards associated with the building materials, paint or other suspect LCMs, and/or other miscellaneous hazardous building materials (potential mercury-containing thermostats, potential PCB-containing items, fluorescent light tubes, exit signs with radioactive sources, and Freon™-containing refrigeration systems) may exist.

Based upon the analytical results of bulk samples collected, and observations made, during this survey, ACMs and/or ACCMs are not located at the site buildings; LCMs are located at 630 and 634 San Anselmo Avenue; and miscellaneous hazardous building materials are located at 634 and 636 San Anselmo Avenue. These materials are discussed below.

6.1 Asbestos-Containing Materials

No materials were found to be asbestos-containing through Ninyo & Moore’s sampling activities.

6.2 Lead-Containing Materials

A total of 18 suspect lead-containing samples were collected for analysis of lead content. This included 12 paint chip samples and six ceramic tile samples. One of the paint chip samples contained lead at a reported concentration greater than 5,000 mg/kg (or 0.5% by weight). This lead concentration was 2.0% by weight (or 20,000 mg/kg) for a sample collected on the upper ceiling of 634 San Anselmo Avenue (LBP-01). This paint sample is considered LBP. The lead concentrations associated with 10 of the paint chip samples and all of the six ceramic tile samples were reported by the analytical laboratory EMSL to be less than their associated reporting limit of 0.010% by weight (100 mg/kg). The reported lead concentration of the remaining paint chip sample was 0.020% by weight (or 200 mg/kg), collected on the exterior wall of 630 San Anselmo Avenue. This paint sample is considered LCP. Occupational Health and Safety Administration (OSHA) regulations apply whenever materials with any detectable amounts of lead are disturbed.

Copies of the CDPH form 8552 "Lead Hazard Evaluation Report" for the site buildings are included in Appendix D.

6.3 Miscellaneous Hazardous Building Material Survey

Miscellaneous hazardous building materials observed at the site buildings included potential PCB-containing light ballasts; fluorescent light tubes; exit signs (potential low-level radioactive sources); refrigerators, air conditioning units, and smoke detectors. No attempt was made to disassemble or sample any of the observed miscellaneous hazardous building materials.

7 RECOMMENDATIONS

Since LCMs and miscellaneous hazardous building materials have been reported at the site buildings, the following recommendations and precautions are provided:

The LCMs reported at the site building should be incorporated into building-specific O&M Plans and should not be disturbed. Any LCMs found in a damaged or non-intact condition should be abated and/or stabilized. Prior to renovation or demolition work that would disturb the identified LCMs a licensed lead abatement removal contractor should stabilize and/or remove the identified LCMs in compliance with the most recent applicable federal, state, and local laws, regulations, standards, and/or codes governing abatement, transport, and disposal of LCMs. All lead waste must be properly characterized prior to disposal to determine waste classification, packaging, transportation, and disposal requirements. ***While Ninyo & Moore provided an estimate of the quantity of LCMs present at the site buildings (Table 2), it is the responsibility of abatement contractors to assess the actual LCM quantities present.***

Prior to demolition or renovation activities, potential mercury-containing thermostats/switches, PCB-containing items (light ballasts, transformers, etc.), fluorescent light tubes, smoke detectors, exit signs, air conditioning units, and FreonTM-containing refrigeration systems should be removed and recycled or disposed of by a licensed contractor according to applicable federal, state, and local laws/regulations. All light fixtures should be visually inspected, prior to disposal, to assess if they contain PCBs (checked for “No PCBs” or “PCB free” stickers). ***While Ninyo & Moore provided an estimate of the quantity of miscellaneous hazardous building materials present at the site buildings (Table 3), it is the abatement contractor’s responsibility to assess the actual quantities of items present.***

There is a possibility that additional suspect ACMs/ACCMs, LCMs, or other miscellaneous hazardous building materials may be discovered during building renovation and/or demolition activities. Therefore, Ninyo & Moore recommends that, should additional suspect materials not sampled or assessed in this report be uncovered during demolition/renovation activities, (a) samples of suspect materials should be collected for laboratory analysis and activities that may impact the materials should cease until laboratory analytical results are reviewed or (b) the materials should be assumed to be hazardous and handled as such.

8 LIMITATIONS

Ninyo & Moore's opinions and recommendations regarding environmental conditions, as presented in this report, are based on limited sampling and chemical analysis. Further assessment of potential adverse environmental impacts may be accomplished by conducting a more comprehensive assessment. The samples collected and used for testing, and the observations made, are believed to be representative of the areas evaluated. However, if additional suspect hazardous building materials are encountered during renovation/demolition activities, these materials should be sampled by qualified personnel, and analyzed for content prior to further disturbance. ***In addition, please note that quantities of impacted hazardous building materials are approximate. It is the contractor’s responsibility to assess the actual quantities of hazardous building materials present.***

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard of care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report. Variations in site conditions may exist and conditions not observed or described in this report may be encountered during subsequent activities.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires any additional information, or has questions regarding content, interpretations presented, or completeness of this document.

The environmental interpretations and opinions contained in this report are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the subject site. The testing and analyses have been conducted by an independent laboratory that is certified by the State of California to conduct such tests. Ninyo & Moore has no involvement in, or control over, such testing and analysis. Ninyo & Moore, therefore, disclaims responsibility for any inaccuracy in such laboratory results.

Our findings, opinions, and recommendations are based on an analysis of the observed site conditions. It should be understood that the conditions of a site can change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

Table 1 - Bulk Asbestos Sampling Results

Sample I.D.	Building	Material Location	Sample Description	Friable Y/N	Quantity	Condition	Asbestos Content
ASB-01	636 San Anselmo Ave	Restaurant - Storage Area	Wallboard/Joint Compound	NA	NA	NA	ND
ASB-02	636 San Anselmo Ave	Restaurant - Storage Area	Wallboard/Joint Compound	NA	NA	NA	ND
ASB-03	636 San Anselmo Ave	Restaurant - Bathroom	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-04	636 San Anselmo Ave	Restaurant - Bathroom	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-05	636 San Anselmo Ave	Restaurant - Bathroom	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-06	634 San Anselmo Ave	Real Estate Office - Bathroom	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-07	634 San Anselmo Ave	Real Estate Office - Bathroom	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-08	634 San Anselmo Ave	Real Estate Office - Back Wall	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-09	634 San Anselmo Ave	Real Estate Office - Conference Room	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-10	634 San Anselmo Ave	Real Estate Office - Conference Room	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-11	634 San Anselmo Ave	Real Estate Office - Bathroom Floor	12-inch by 12-inch Beige Ceramic Tile (CT) with Mortar & Grout	NA	NA	NA	ND
ASB-12	634 San Anselmo Ave	Real Estate Office - Entryway	12-inch by 12-inch Black CT with Mortar & Grout	NA	NA	NA	ND
ASB-13	634 San Anselmo Ave	Optometrist - Bathroom Floor	12-inch by 12-inch Beige CT with Mortar & Grout	NA	NA	NA	ND
ASB-14	634 San Anselmo Ave	Optometrist - Bathroom Wall	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-15	634 San Anselmo Ave	Optometrist - Bathroom Wall	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-16	634 San Anselmo Ave	Optometrist - Exam Room	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-17	634 San Anselmo Ave	Optometrist - Main Room	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-18	634 San Anselmo Ave	Optometrist - Main Room	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-19	634 San Anselmo Ave	Barber - Southwest Corner	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-20	634 San Anselmo Ave	Barber - Northwest Corner	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-21	634 San Anselmo Ave	Barber - Southeast Corner	Wallboard/Joint Compound with Texture	NA	NA	NA	ND
ASB-22	634 San Anselmo Ave	Barber - Floor	12-inch by 12-inch White CT with Mortar & Grout	NA	NA	NA	ND
ASB-23	634 San Anselmo Ave	Roof (Lower)	Rolled Roof Assembly	NA	NA	NA	ND
ASB-24	634 San Anselmo Ave	Roof (Upper)	Rolled Roof Assembly	NA	NA	NA	ND

Table 1 - Bulk Asbestos Sampling Results							
Sample I.D.	Building	Material Location	Sample Description	Friable Y/N	Quantity	Condition	Asbestos Content
ASB-25	634 San Anselmo Ave	Roof (Barber Shop)	Rolled Roof Assembly	NA	NA	NA	ND
ASB-26	636 San Anselmo Ave	Roof (Upper)	Rolled Roof Assembly	NA	NA	NA	ND
ASB-27	636 San Anselmo Ave	Roof (Lower)	Rolled Roof Assembly	NA	NA	NA	ND
ASB-28	636 San Anselmo Ave	Roof - Vent on Lower Roof	Black Penetration Mastic	NA	NA	NA	ND
ASB-29	636 San Anselmo Ave	Roof - on Horizontal Pipe on Lower Roof	Black Mastic	NA	NA	NA	ND
ASB-30	636 San Anselmo Ave	Roof - at Base of Air Handler	Black Patch Material	NA	NA	NA	ND
ASB-31	636 San Anselmo Ave	Roof - on Air Handler Duct	Gray Alligatored Sealant	NA	NA	NA	ND
ASB-32	634 San Anselmo Ave	Real Estate Office Roof - on Vent	Black Penetration Mastic	NA	NA	NA	ND
ASB-33	634 San Anselmo Ave	Optometry Roof - on Horizontal Pipe	Black Mastic	NA	NA	NA	ND
ASB-34	634 San Anselmo Ave	Optometry Roof - on Large Green Duct	Gray Mastic	NA	NA	NA	ND
ASB-35	634 San Anselmo Ave	Lower Roof - on Vent	Gray Mastic (painted green)	NA	NA	NA	ND
ASB-36	634 San Anselmo Ave	Barber Roof - on Vent	Black Penetration Mastic	NA	NA	NA	ND
ASB-37	630 San Anselmo Ave	Exterior Wall	Cinder Block & Mortar	NA	NA	NA	ND
ASB-38	630 San Anselmo Ave	Exterior Wall	Mortar	NA	NA	NA	ND
ASB-39	630 San Anselmo Ave	Exterior Wall	Mortar	NA	NA	NA	ND
ASB-40	630 San Anselmo Ave	Exterior Window	Window Putty	NA	NA	NA	ND
ASB-41	630 San Anselmo Ave	Roof	Brown Asphaltic Tile	NA	NA	NA	ND
ASB-42	634 San Anselmo Ave	Optometrist - Brick Wall	Brick & Mortar	NA	NA	NA	ND
ASB-43	634 San Anselmo Ave	Optometrist - Brick Wall	Mortar	NA	NA	NA	ND

Table 1 - Bulk Asbestos Sampling Results							
Sample I.D.	Building	Material Location	Sample Description	Friable Y/N	Quantity	Condition	Asbestos Content
ASB-44	634 San Anselmo Ave	Optometrist - Brick Wall	Mortar	NA	NA	NA	ND
ASB-45	636 San Anselmo Ave	Kitchen Floor	5-inch by 5-inch Brownish-Red CT with Mortar & Grout	NA	NA	NA	ND
ASB-46	636 San Anselmo Ave	Bar Floor	5-inch by 5-inch Gray CT with Mortar & Grout	NA	NA	NA	ND
ASB-47	636 San Anselmo Ave	Kitchen Wall Base	White Sealant	NA	NA	NA	ND
ASB-48	636 San Anselmo Ave	Bathroom	Gray Mottled Vinyl Floor Sheeting (VFS) with Gray Flooring Beneath	NA	NA	NA	ND
ASB-49	636 San Anselmo Ave	Bathroom	Gray 3-inch Covebase with White Mastic	NA	NA	NA	ND
ASB-50	636 San Anselmo Ave	Dining Area Wall	Red Brick with Gray Sealant	NA	NA	NA	ND
ASB-51	636 San Anselmo Ave	Exterior Front Patio	2-foot by 2-foot Concrete Tile with Grout	NA	NA	NA	ND
ASB-52	636 San Anselmo Ave	Kitchen Wall	Cinder Block & Mortar	NA	NA	NA	ND
ASB-53	636 San Anselmo Ave	Kitchen Wall	Mortar	NA	NA	NA	ND
ASB-54	636 San Anselmo Ave	Kitchen Wall	Mortar	NA	NA	NA	ND

NOTES:

Analysis by Polarized Light Microscopy (EPA 600/R-93/116 Method).

NA = Not Applicable

ND = None Detected

Table 2 - Lead-Containing Material Sampling Results

Sample I.D.	Building	Sample Location	Lead-Containing Surface (LCS) (e.g., door, wall, frame)	Sample Description (Color / # of Layers / Substrate)	Condition	Estimate of Surface Area	Total Lead	
							Weight Percent	Parts per Million (or mg/kg)
LBP-01	634 San Anselmo Avenue	Real Estate Office - Above Ceiling on Upper Ceiling	Ceiling	White/2/Metal	Non-Intact	1,100 SF	2.0	20,000
LBP-02	634 San Anselmo Avenue	Real Estate Office - Bathroom Floor	Floor	Beige 12-inch by 12-inch Ceramic Tile (CT)	Intact	30 SF	<0.010	<100
LBP-03	634 San Anselmo Avenue	Real Estate Office - Entryway	Floor	Black 12-inch by 12-inch CT	Intact	15 SF	<0.010	<100
LBP-04	634 San Anselmo Avenue	Real Estate Office - Bathroom	Wall	Olive-Green/2/Wallboard	Intact	900 SF	<0.010	<100
LBP-05	634 San Anselmo Avenue	Optometry - Bathroom	Floor	Beige 12-inch by 12-inch CT	Intact	70 SF	<0.010	<100
LBP-06	634 San Anselmo Avenue	Optometry - Examination Room Door	Door Frame	White/2/Wood	Intact	1,500 SF	<0.010	<100
LBP-07	634 San Anselmo Avenue	Barber	Floor	White 12-inch by 12-inch CT	Intact	180 SF	<0.010	<100
LBP-08	634 San Anselmo Avenue	Barber	Wall	Brownish-Red/2/Wallboard	Intact	300 SF	<0.010	<100
LBP-09	634 San Anselmo Avenue	Optometry - Exterior Rear	Pipe	Dark-Green/2/Metal	Intact	1,000 SF	<0.010	<100
LBP-10	636 San Anselmo Avenue	Exterior Rear	Pipe	Dark-Green/2/Metal	Intact	1,200 SF	<0.010	<100
LBP-11	630 San Anselmo Avenue	Exterior Wall	Wall	Dark-Green/2/Concrete	Intact	320 SF	0.020	200*
LBP-12	634 San Anselmo Avenue	Optometry - Bathroom Wall	Wall	Cream/2/Wallboard	Intact	400 SF	<0.010	<100
LBP-13	636 San Anselmo Avenue	Kitchen	Floor	Brownish-Red 5-inch by 5-inch CT	Intact	450 SF	<0.010	<100
LBP-14	636 San Anselmo Avenue	Bar	Floor	Gray 5-inch by 5-inch CT	Intact	25 SF	<0.010	<100
LBP-15	636 San Anselmo Avenue	Kitchen Door	Door Frame	White/2/Wood	Intact	1,700 SF	<0.010	<100
LBP-16	636 San Anselmo Avenue	Wine Storage Area	Wall	Light-Brownish Yellow/2/Wallboard	Intact	700 SF	<0.010	<100
LBP-17	636 San Anselmo Avenue	Wine Storage Area	Floor	Gray/2/Concrete	Intact	600 SF	<0.010	<100
LBP-18	630 San Anselmo Avenue	Interior Wall	Wall	White/2/Concrete	Intact	400 SF	<0.010	<100

NOTES:
Total lead analyzed in accordance with EPA Test Method EPA SW-846 3050B/7000B.
mg/kg = Milligrams per kilogram
SF = Square feet
* indicates lead-containing paint
Estimated quantities are not intended for use in bidding calculations.

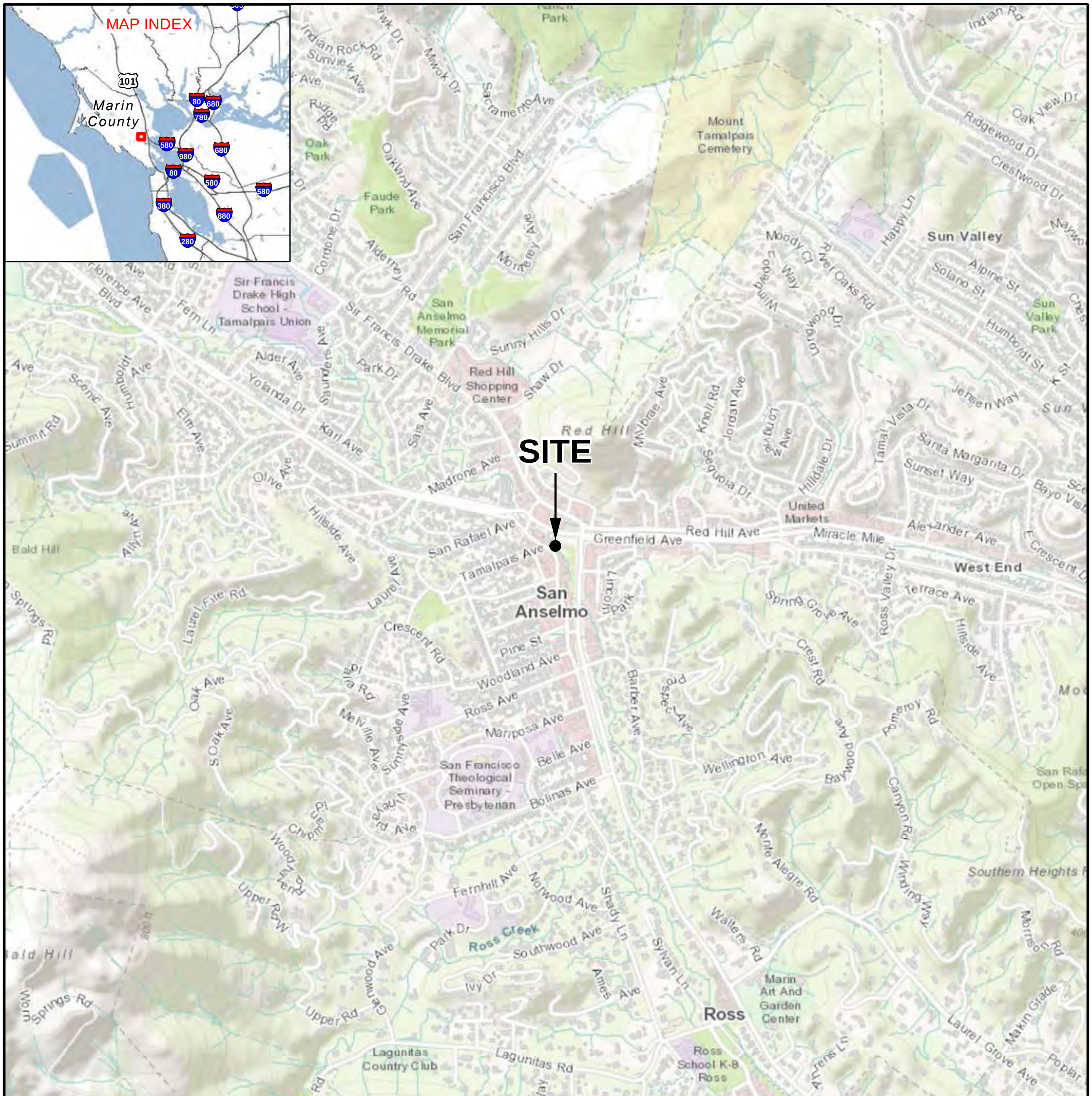
Table 3 - Miscellaneous Hazardous Building Materials Survey Results

Building	Number of Transformers	Number of Light Ballasts	Number of Mercury Thermostats	Number of A/C Units	No. of Fluorescent Light Tubes	Number of Smoke Detectors	Number of Exit Signs	No. of Freon Refrigerator Systems
636 San Anselmo Avenue	0	8	0	1	16	4	1	2
634 San Anselmo Avenue	0	0	0	0	0	5	0	0
630 San Anselmo Avenue	0	0	0	0	0	0	0	0

NOTES:

A/C = Air Conditioning

FIGURES



1_403163001_SL.mxd 11/10/2017 AOB

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: ESRI WORLD TOPO, 2017

FIGURE 1

SITE LOCATION

630, 634, AND 636 SAN ANSELMO AVENUE
SAN ANSELMO, CALIFORNIA

403163001 | 11/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: GOOGLE EARTH, 2017

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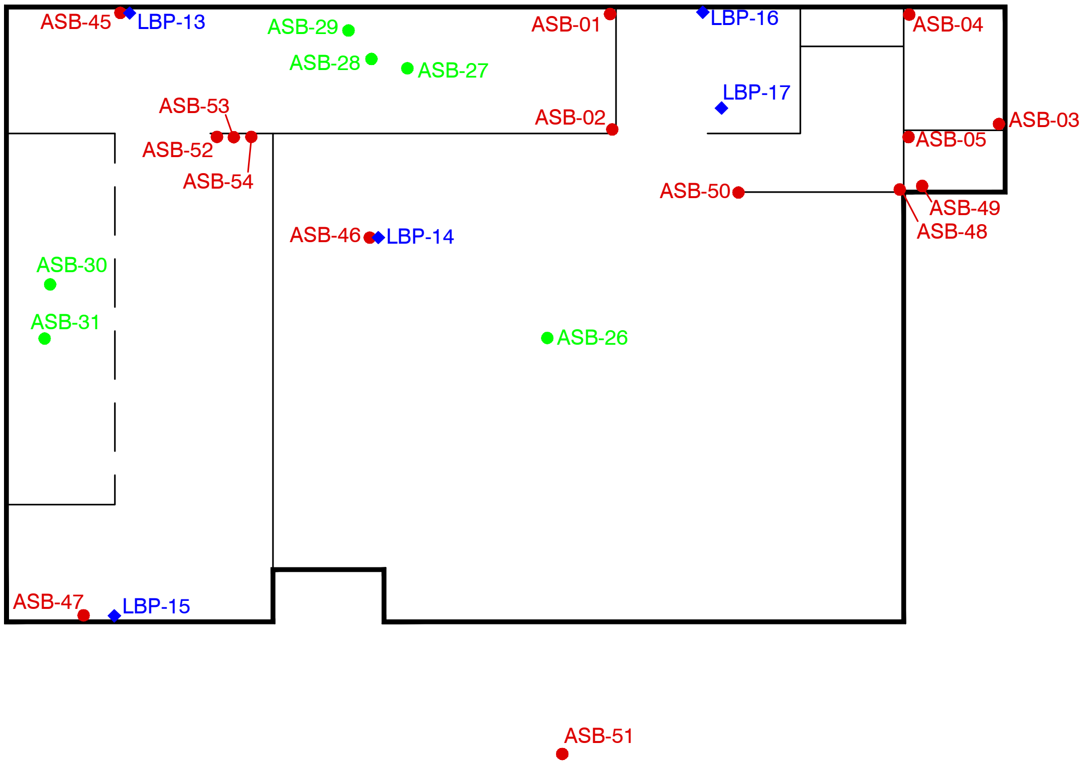
FIGURE 2

SITE PLAN

630, 634, AND 636 SAN ANSELMO AVENUE
SAN ANSELMO, CALIFORNIA

403163001 | 11/17

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



LEGEND

ASB-51 ● SUSPECT ASBESTOS SAMPLE

ASB-31 ● SUSPECT ASBESTOS ROOF SAMPLE

LBP-17 ◆ SUSPECT LEAD PAINT CHIP SAMPLE

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

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FEET

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3 403163001 SPL 636.DWG

FIGURE 3

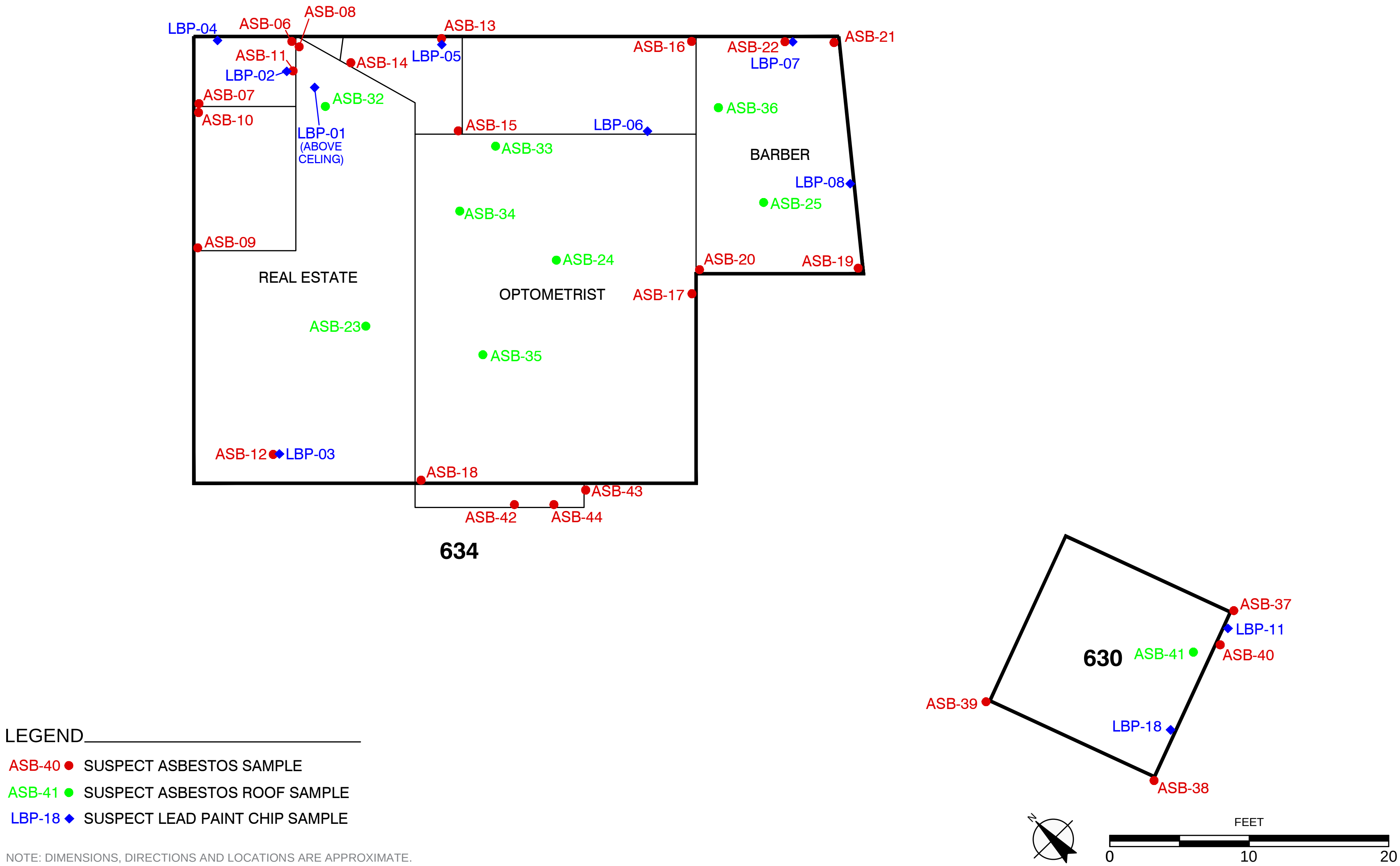
Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

SAMPLE LOCATIONS, 636 SAN ANSELMO AVENUE

630, 634, AND 636 SAN ANSELMO AVENUE
SAN ANSELMO, CALIFORNIA

403163001 I 11/17



4 403163001 SPL 630 634.DWG

FIGURE 4

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

SAMPLE LOCATIONS, 630 AND 634 SAN ANSELMO AVENUE

630, 634, AND 636 SAN ANSELMO AVENUE
SAN ANSELMO, CALIFORNIA

403163001 I 11/17

APPENDIX A

Certifications

State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

David B Bridges
Name

Certification No. **14-5173**

Expires on **02/12/18**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.

State of California Department of Public Health

Lead-Related Construction Certificate

Certificate Type	Expiration Date
Inspector/Assessor	10/11/2018

David B. Bridges ID #: 24052

Conditions of Certification

This individual meets the requirements of the State of California, Department of Public Health (CDPH), to perform lead-related construction. CDPH may suspend or revoke certification for:

1. any false statement in the application (for certification);
2. violations of relevant local, state or federal statutes or regulations;
3. misrepresentation, failure to disclose relevant facts, fraud, or issuance by mistake; or
4. failure to comply with any relevant regulation or order of the Department.

This certificate was issued by the Department of Public Health as authorized by 17 CCR 35001 et seq., and is non-transferable.

To verify authenticity call (800) 597-LEAD or 510-620-5600

03164508

APPENDIX B

Asbestos Laboratory Analytical Report and Chain-of-Custody Records

EMSL Analytical, Inc.

464 McCormick Street San Leandro, CA 94577

Tel/Fax: (510) 895-3675 / (510) 895-3680

http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order: 091721313
Customer ID: NOMO22
Customer PO: 403163001
Project ID:

Attention: Blair Bridges
Ninyo & Moore
1956 Webster
Suite 400
Oakland, CA 94612

Project: 403163001 - San Anselmo

Phone: (510) 715-7224
Fax: (510) 633-5646
Received Date: 11/03/2017 11:15 AM
Analysis Date: 11/06/2017
Collected Date: 11/02/2017

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
ASB-01-Joint Compound *091721313-0001*	Building 636 - Storage Area - Wallboard/Joint Compound	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-01-Wallboard *091721313-0001A*	Building 636 - Storage Area - Wallboard/Joint Compound	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-02-Joint Compound *091721313-0002*	Building 636 - Storage Area - Wallboard/Joint Compound	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-02-Wallboard *091721313-0002A*	Building 636 - Storage Area - Wallboard/Joint Compound	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-03-Joint Compound *091721313-0003*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-03-Wallboard *091721313-0003A*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-03-Texture *091721313-0003B*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-04-Joint Compound *091721313-0004*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-04-Wallboard *091721313-0004A*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-04-Texture *091721313-0004B*	Building 636 - Men's Bathroom - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-05-Joint Compound *091721313-0005*	Building 636 - Women's Bathroom - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-05-Wallboard *091721313-0005A*	Building 636 - Women's Bathroom - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected

Initial report from: 11/06/2017 15:41:38

EMSL Analytical, Inc.
464 McCormick Street San Leandro, CA 94577
Tel/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order:	091721313
Customer ID:	NOMO22
Customer PO:	403163001
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
ASB-05-Texture *091721313-0005B*	Building 636 - Women's Bathroom - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-06-Wallboard *091721313-0006*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-06-Joint Compound *091721313-0006A*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-06-Texture *091721313-0006B*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-07-Joint Compound *091721313-0007*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-07-Wallboard *091721313-0007A*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-07-Texture *091721313-0007B*	Building 634 - Bathroom (RE) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-08-Joint Compound *091721313-0008*	Building 634 - Back Wall (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-08-Wallboard *091721313-0008A*	Building 634 - Back Wall (RE) - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-08-Texture *091721313-0008B*	Building 634 - Back Wall (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-09-Joint Compound *091721313-0009*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-09-Wallboard *091721313-0009A*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Cellulose 1% Glass	80% Gypsum 17% Non-fibrous (Other)	None Detected
ASB-09-Texture *091721313-0009B*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-10-Joint Compound *091721313-0010*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected

Initial report from: 11/06/2017 15:41:38

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
ASB-10-Wallboard *091721313-0010A*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-10-Texture *091721313-0010B*	Building 634 - Conference Room (RE) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-11-Ceramic Tile *091721313-0011*	Building 634 - Bathroom Floor (RE) - Beige 12" CT w/ Grout & Mortar	Beige Non-Fibrous Homogeneous		15% Quartz 30% Gypsum 55% Non-fibrous (Other)	None Detected
ASB-11-Grout *091721313-0011A*	Building 634 - Bathroom Floor (RE) - Beige 12" CT w/ Grout & Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 15% Gypsum 65% Non-fibrous (Other)	None Detected
ASB-11-Mortar *091721313-0011B*	Building 634 - Bathroom Floor (RE) - Beige 12" CT w/ Grout & Mortar				Insufficient Material
ASB-12-Ceramic Tile *091721313-0012*	Building 634 - Entryway (RE) - Black 12" CT w/ Grout & Mortar	Gray Non-Fibrous Homogeneous		15% Quartz 30% Gypsum 55% Non-fibrous (Other)	None Detected
ASB-12-Grout *091721313-0012A*	Building 634 - Entryway (RE) - Black 12" CT w/ Grout & Mortar	Black Non-Fibrous Homogeneous		20% Quartz 15% Gypsum 65% Non-fibrous (Other)	None Detected
ASB-13-Ceramic Tile *091721313-0013*	Building 634 - Bathroom Floor (Optometry) - Beige 12" CT w/ Grout & White Mortar	Brown Non-Fibrous Homogeneous		10% Quartz 30% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-13-Grout *091721313-0013A*	Building 634 - Bathroom Floor (Optometry) - Beige 12" CT w/ Grout & White Mortar	Brown Non-Fibrous Homogeneous		20% Quartz 15% Gypsum 65% Non-fibrous (Other)	None Detected
ASB-13-Mortar *091721313-0013B*	Building 634 - Bathroom Floor (Optometry) - Beige 12" CT w/ Grout & White Mortar	White Non-Fibrous Homogeneous		20% Quartz 70% Ca Carbonate 10% Non-fibrous (Other)	None Detected
ASB-14-Joint Compound *091721313-0014*	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-14-Wallboard *091721313-0014A*	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-14-Texture *091721313-0014B*	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected

Initial report from: 11/06/2017 15:41:38

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	Description	Appearance	% Fibrous	% Non-Fibrous	% Type
ASB-15-Wallboard 091721313-0015	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-15-Joint Compound 091721313-0015A	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-15-Texture 091721313-0015B	Building 634 - Bathroom (Optometry) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-16-Joint Compound 091721313-0016	Building 634 - Exam Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-16-Wallboard 091721313-0016A	Building 634 - Exam Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-16-Texture 091721313-0016B	Building 634 - Exam Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-17-Wallboard 091721313-0017	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-17-Joint Compound 091721313-0017A	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-17-Texture 091721313-0017B	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-18-Wallboard 091721313-0018	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture	Beige Non-Fibrous Homogeneous	2% Glass	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-18-Joint Compound 091721313-0018A	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-18-Texture 091721313-0018B	Building 634 - Main Room (Optometry) - Wallboard/Joint Compound w/ Texture				Insufficient Material
ASB-19-Wallboard 091721313-0019	Building 634 - SW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-19-Joint Compound 091721313-0019A	Building 634 - SW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected

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http://www.EMSL.com / sanleandrolab@emsl.com

EMSL Order: 091721313
Customer ID: NOMO22
Customer PO: 403163001
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
ASB-19-Texture 091721313-0019B	Building 634 - SW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-20-Joint Compound 091721313-0020	Building 634 - NW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-20-Wallboard 091721313-0020A	Building 634 - NW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-20-Texture 091721313-0020B	Building 634 - NW Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-21-Wallboard 091721313-0021	Building 634 - SE Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous	2% Cellulose	80% Gypsum 18% Non-fibrous (Other)	None Detected
ASB-21-Joint Compound 091721313-0021A	Building 634 - SE Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-21-Texture 091721313-0021B	Building 634 - SE Corner (Barber) - Wallboard/Joint Compound w/ Texture	White Non-Fibrous Homogeneous		80% Ca Carbonate 20% Non-fibrous (Other)	None Detected
ASB-22-Ceramic Tile 091721313-0022	Building 634 - Floor (Barber) - 12" White CT w/ Grout & Mortar	White Non-Fibrous Homogeneous		10% Quartz 30% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-22-Grout 091721313-0022A	Building 634 - Floor (Barber) - 12" White CT w/ Grout & Mortar	Tan Non-Fibrous Homogeneous		25% Quartz 75% Non-fibrous (Other)	None Detected
ASB-22-Mortar 091721313-0022B	Building 634 - Floor (Barber) - 12" White CT w/ Grout & Mortar				Insufficient Material
ASB-23 091721313-0023	Building 634 - Roof (lower) - Rolled Roof Assembly	White/Black Fibrous Homogeneous	10% Glass	10% Quartz 25% Ca Carbonate 40% Matrix 15% Non-fibrous (Other)	None Detected
ASB-24 091721313-0024	Building 634 - Roof (upper) - Rolled Roof Assembly	White/Black Fibrous Homogeneous	10% Glass	10% Quartz 25% Ca Carbonate 40% Matrix 15% Non-fibrous (Other)	None Detected
ASB-25 091721313-0025	Building 634 - Roof of Barber Shop - Rolled Roof Assembly	White/Black Non-Fibrous Homogeneous	10% Glass	10% Quartz 25% Ca Carbonate 40% Matrix 15% Non-fibrous (Other)	None Detected
ASB-26 091721313-0026	Building 636 - Roof of Restaurant (upper) - Rolled Roof Assembly	Black Non-Fibrous Homogeneous	15% Cellulose 10% Glass	10% Quartz 25% Ca Carbonate 40% Matrix	None Detected
ASB-27 091721313-0027	Building 636 - Restaurant Lower Roof - Rolled Roof Assembly	Black Non-Fibrous Homogeneous	15% Cellulose 10% Glass	10% Quartz 25% Ca Carbonate 40% Matrix	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
ASB-28 091721313-0028	Building 636 - Roof on Lower Roof Vent - Black Penetration Mastic	White/Black Non-Fibrous Homogeneous		5% Quartz 80% Matrix 15% Non-fibrous (Other)	None Detected
ASB-29 091721313-0029	Building 636 - Roof on Pipe Exterior on Lower Roof - Black Mastic	Black Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
ASB-30 091721313-0030	Building 636 - Roof at Base of Air Handlers - Black Patch Material	Black Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
ASB-31 091721313-0031	Building 636 - Roof on Air Handler Duct - Gray Alligatored Sealant	Gray Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
ASB-32 091721313-0032	Building 634 - Bank Roof on Vent - Black Penetration Mastic	Black Non-Fibrous Homogeneous	25% Cellulose	70% Matrix 5% Non-fibrous (Other)	None Detected
ASB-33 091721313-0033	Building 634 - Optometry Roof on Pipe Exterior - Black Mastic	Black Non-Fibrous Homogeneous		80% Matrix 20% Non-fibrous (Other)	None Detected
ASB-34 091721313-0034	Building 634 - Optometry Roof on Large Green Duct - Gray Mastic (painted green)	Gray Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
ASB-35 091721313-0035	Building 634 - Lower Roof on Vent Penetration - Black (newer) Sealant/Mastic	Black Fibrous Homogeneous	10% Cellulose	5% Quartz 80% Matrix 5% Non-fibrous (Other)	None Detected
ASB-36 091721313-0036	Building 634 - Barber Roof on Vent - Black Penetration Mastic	Black Non-Fibrous Homogeneous	15% Cellulose	80% Matrix 5% Non-fibrous (Other)	None Detected
ASB-37 091721313-0037	Building 630 - Exterior Wall - Cinderblock & Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-38 091721313-0038	Building 630 - Exterior Wall - Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-39 091721313-0039	Building 630 - Exterior Wall - Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-40 091721313-0040	Building 630 - Exterior Window - Window Putty	Gray Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
ASB-41 091721313-0041	Building 630 - Roof - Tile (Brown)	Black Fibrous Homogeneous	5% Glass	35% Quartz 60% Matrix	None Detected
ASB-42-Brick 091721313-0042	Building 634 - Optometrists Front Garden Wall - Brick & Mortar	Brown Non-Fibrous Homogeneous		20% Quartz 25% Gypsum 55% Non-fibrous (Other)	None Detected
ASB-42-Mortar 091721313-0042A	Building 634 - Optometrists Front Garden Wall - Brick & Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected

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EMSL Order: 091721313
Customer ID: NOMO22
Customer PO: 403163001
Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos % Fibrous	Non-Asbestos % Non-Fibrous	Asbestos % Type
ASB-43 091721313-0043	Building 634 - Optometrists Front Garden Wall - Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-44 091721313-0044	Building 634 - Optometrists Front Garden Wall - Mortar	Tan Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-45-Ceramic Tile 091721313-0045	Building 636 - Kitchen Floor - Brownish-Red CT w/ Grout & Mortar (5")	Brown Non-Fibrous Homogeneous		15% Quartz 30% Gypsum 55% Non-fibrous (Other)	None Detected
ASB-45-Grout 091721313-0045A	Building 636 - Kitchen Floor - Brownish-Red CT w/ Grout & Mortar (5")	Gray Non-Fibrous Homogeneous		25% Quartz 75% Non-fibrous (Other)	None Detected
ASB-45-Mortar 091721313-0045B	Building 636 - Kitchen Floor - Brownish-Red CT w/ Grout & Mortar (5")	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-46-Ceramic Tile 091721313-0046	Building 636 - Bar Floor - Gray 5" CT w/ Grout & Mortar	Gray Non-Fibrous Homogeneous		10% Quartz 25% Gypsum 65% Non-fibrous (Other)	None Detected
ASB-46-Grout 091721313-0046A	Building 636 - Bar Floor - Gray 5" CT w/ Grout & Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected
ASB-46-Mortar 091721313-0046B	Building 636 - Bar Floor - Gray 5" CT w/ Grout & Mortar				Insufficient Material
ASB-47 091721313-0047	Building 636 - Kitchen Base CT/Wall - White Sealant	White Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
ASB-48-Vinyl Sheet Flooring 091721313-0048	Building 636 - Bathroom - Gray Mottled VFS w/ Gray Flooring beneath	Gray Non-Fibrous Homogeneous		30% Ca Carbonate 70% Matrix	None Detected
ASB-48-Leverer 091721313-0048A	Building 636 - Bathroom - Gray Mottled VFS w/ Gray Flooring beneath	Gray Non-Fibrous Homogeneous		70% Ca Carbonate 30% Non-fibrous (Other)	None Detected
ASB-49-Cove Base 091721313-0049	Building 636 - Bathroom - 3" Gray Cove Base w/ Mastic	Gray Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
ASB-49-Mastic 091721313-0049A	Building 636 - Bathroom - 3" Gray Cove Base w/ Mastic	Tan Non-Fibrous Homogeneous		70% Matrix 30% Non-fibrous (Other)	None Detected
ASB-50-Brick 091721313-0050	Building 636 - Dining Area Wall - Brick w/ Gray Sealant	Red Non-Fibrous Homogeneous		15% Quartz 20% Gypsum 65% Non-fibrous (Other)	None Detected
ASB-50-Sealant 091721313-0050A	Building 636 - Dining Area Wall - Brick w/ Gray Sealant	Gray Non-Fibrous Homogeneous		20% Quartz 70% Matrix 10% Non-fibrous (Other)	None Detected
ASB-51-Concrete 091721313-0051	Building 636 - Exterior Front Patio - 2'x2' Concrete Tile w/ Grout	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-51-Grout 091721313-0051A	Building 636 - Exterior Front Patio - 2'x2' Concrete Tile w/ Grout	Gray Non-Fibrous Homogeneous		20% Quartz 80% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
ASB-52 *091721313-0052*	Building 636 - Kitchen Wall - Cinder Block w/ Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-53 *091721313-0053*	Building 636 - Kitchen Wall - Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected
ASB-54 *091721313-0054*	Building 636 - Kitchen Wall - Mortar	Gray Non-Fibrous Homogeneous		20% Quartz 20% Gypsum 60% Non-fibrous (Other)	None Detected

Analyst(s)
Jared Martin (92)

Matthew Batongbacal
or Other Approved Signatory

Initial report from: 11/06/2017 15:41:38

3 day TAT

ASBESTOS BULK SAMPLE DATA SHEET

Ninyo & Moore 1956 Webster Street Oakland, CA 94612 Tel: 510 343 3000	San Anselmo Project No.: 403163001 Site Address: San Anselmo	Sampled By: Blair Bridges Sampled By: Sampled By: Date Sampled: 11/2/17	**Laboratory:** EMSL

CHAIN OF CUSTODY INFORMATION:

Relinquished By: (sign/print)	Company	Date	Time(24 hr.)	Received By: (sign/print)	Laboratory
B Bridges / Blair Bridges	Ninyo & Moore	11/3/17	1110	/	
/		11/3/17	11:15AM WI	[signature] / TR	

LabID	Sample ID	Building	Sample Location	Sample Description	Quantity (SF/LF/EA)	Friable (Y/N)	Condition
	ASB-01	636	Storage Area	Wallboard / Joint Compound		Y	Good
	ASB-02	↓	" "	Wallboard / Joint Compound		↓	↓
	ASB-03	↓	Men's Bathroom	" / " " w/ texture		↓	↓
	ASB-04	↓	" "	" / " " " "		↓	↓
	ASB-05	↓	Women's "	" / " " " "		↓	↓
	ASB-06	634	Bathroom (LE)	" / " " " "	1500SF	↓	↓
	ASB-07	↓	" (")	↓		↓	↓
	ASB-08	↓	Back Wall (")	↓		↓	↓
	ASB-09	↓	Conference Room (")	↓		↓	↓
	ASB-10	↓	" " (")	↓		↓	↓
	ASB-11	↓	Bathroom Floor (")	Beige 12" CT w/ grout & mortar	30SF	N	↓
	ASB-12	↓	Entryway (")	Black " " " " " "	15SF	↓	↓
	ASB-13	↓	Bathroom Floor (optometry)	Beige 12" " " " " white "	70SF	↓	↓

Ninyo & Moore

OrderID: 091721313

ASBESTOS BULK SAMPLE DATA SHEET

Ninyo & Moore 1956 Webster Street Oakland, CA 94612 Tel: 510 343 3000	San Anselmo Project No.: 403163001 Site Address: San Anselmo	Sampled By: Blair Bridges Sampled By: Sampled By: Date Sampled: 11/2/17	Laboratory: EMSL

CHAIN OF CUSTODY INFORMATION:

Relinquished By: (sign/print)	Company	Date	Time(24 hr.)	Received By: (sign/print)	Laboratory
B Bridges /Blair Bridges	Ninyo & Moore	11/3/17	1110	/	
/				/	

LabID	Sample ID	Building	Sample Location	Sample Description	Quantity (SF/LF/EA)	Friable (Y/N)	Condition
	ASB-14	634	Bathroom (optometry)	Wallboard/Joint compound w/ texture	2400 SF	Y	Good
	ASB-15	↓	" (")	↓		↓	↓
	ASB-16	↓	Exam Room (")	↓		↓	↓
	ASB-17	↓	Main " (")	↓		↓	↓
	ASB-18	↓	" " (")	↓		↓	↓
	ASB-19	↓	SW corner (Barber)	↓	700 SF	↓	↓
	ASB-20	↓	NW " (")	↓		↓	↓
	ASB-21	↓	SE " (")	↓		↓	↓
	ASB-22	↓	Floor (")	12" white CT w/ grout + Mortar	180 SF	N	↓
	ASB-23	↓	Roof (lower)	Rolled Roof Assembly	420 SF	↓	↓
	ASB-24	↓	" upper	" " "	800 SF	↓	↓
	ASB-25	↓	" of Barber shop	" " "	200 SF	↓	↓
	ASB-26	636	" of Restaurant (upper)	" " "	850 SF	↓	↓

ASBESTOS BULK SAMPLE DATA SHEET

Ninyo & Moore 1956 Webster Street Oakland, CA 94612 Tel: 510 343 3000	San Anselmo Project No.: 40316300| Site Address: San Anselmo	Sampled By: Blair Bridges Sampled By: Sampled By: Date Sampled: 11/2/17	**Laboratory:** EMSL

CHAIN OF CUSTODY INFORMATION:

Relinquished By: (sign/print)	Company	Date	Time(24 hr.)	Received By: (sign/print)	Laboratory
BBridges /Blair Bridges	Ninyo & Moore	11/3/17	1110	/	
/				/	

LabID	Sample ID	Building	Sample Location	Sample Description	Quantity (SF/LF/EA)	Friable (Y/N)	Condition
	ASB-27	636	Restaurant Lower Roof	Rolled Roof Assembly	360 SF	N	Good
	ASB-28	↓	Roof ~~Roof " " Vent~~ on " " vent	Black Penetration Mastic	16 SF	↓	↓
	ASB-29	↓	" on pipe ~~exterior on~~ lower roof	" mastic	15 SF	↓	Poor
	ASB-30	↓	" at base of air handler	Black Patch material	50 SF	↓	Good
	ASB-31	↓	" on Air handler duct.	Gray Alligatored Sealant	8 SF	↓	↓
	ASB-32	634	Bank Roof on vent	Black Penetration mastic	25 SF	↓	↓
	ASB-33	↓	Optometry Roof on Pipe Exterior	" mastic	10 SF	↓	↓
	ASB-34	↓	" " " large Green Duct	Gray mastic (painted Green)	30 SF	↓	↓
	ASB-35	↓	Lower roof on vent Penetration	Black (newer) Sealant/mastic	15 SF	↓	↓
	ASB-36	↓	Barber Roof on vent	Black Penetration Mastic	8 SF	↓	↓
	ASB-37	630	Exterior wall	Cinderblock Mortar	120 SF	↓	↓
	ASB-38	↓	" "	mortar		↓	↓
	ASB-39	↓	" "	mortar		↓	↓

OrderID: 091721313

ASBESTOS BULK SAMPLE DATA SHEET

Ninyo & Moore 1956 Webster Street Oakland, CA 94612 Tel: 510 343 3000	San Anselmo Project No.: 403163001 Site Address: San Anselmo	Sampled By: Blair Bridges Sampled By: Sampled By: Date Sampled: 11/2/17	**Laboratory:** EMSL

CHAIN OF CUSTODY INFORMATION:

Relinquished By: (sign/print)	Company	Date	Time(24 hr.)	Received By: (sign/print)	Laboratory
[signature] /Blair Bridges	Ninyo & Moore	11/3/17	1110	/	/
/				/	

LabID	Sample ID	Building	Sample Location	Sample Description	Quantity (SF/LF/EA)	Friable (Y/N)	Condition
	ASB-40	~~360~~ 636	Exterior Window	window putty	190 LF	N	Good
	ASB-41	↓	Roof	Tile (Brown)	200 SF	↓	↓
	ASB-42	634	optometrists Front Garden wall	Brick + Mortar	400 SF		
	ASB-43		↓	Mortar			
	ASB-44			"			
	ASB-45	636	Kitchen Floor	Brownish-Red CT w/ Grout + Mortar (5")	450 SF		
	ASB-46		Bar Floor	Gray 5" CT w/ Grout + Mortar	25 SF		
	ASB-47		Kitchen Base CT/wall	white Sealant	100 LF		
	ASB-48		Bathroom	Gray mottled VFS w/ Gray Flooring beneath	120 SF		
	ASB-49		"	3" Gray Cove base w/ mastic	60 LF		
	ASB-50		Dining Area Wall	Brick w/ Gray sealant	300 SF		
	ASB-51		Exterior Front Patio	2'x2' Concrete Tile w/ Grout	700 SF		
	ASB-52		Kitchen Wall	Cinder Block w/ mortar	100 SF		
	ASB-53		~~Kit~~ " "	Mortar			
	ASB-54	↓	" "	Mortar		↓	↓

Ninyo & Moore

APPENDIX C

Lead-Containing Material Laboratory Analytical Report
and Chain-of-Custody Records

EMSL Analytical, Inc
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EMSL Order:	091721244
CustomerID:	NOMO22
CustomerPO:	
ProjectID:	

Attn: **Blair Bridges**
Ninyo & Moore
1956 Webster
Suite 400
Oakland, CA 94612

Phone:	(510) 633-5640
Fax:	(510) 633-5646
Received:	11/03/17 11:15 AM
Collected:	11/2/2017

Project: **SAN ANSELMO**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*RDL*	*Lead Concentration*
LBP-01 *091721244-0001*	11/2/2017	11/4/2017 Site: ABOVE CEILING ON UPPER CEILING	0.20 % wt	2.0 % wt
LBP-02 *091721244-0002*	11/2/2017	11/4/2017 Site: BATHROOM FLOOR	0.010 % wt	<0.010 % wt
LBP-03 *091721244-0003*	11/2/2017	11/4/2017 Site: ENTRYWAY	0.010 % wt	<0.010 % wt
LBP-04 *091721244-0004*	11/2/2017	11/4/2017 Site: BATHROOM	0.010 % wt	<0.010 % wt
LBP-05 *091721244-0005*	11/2/2017	11/4/2017 Site: BATHROOM (OPTOMETRY)	0.010 % wt	<0.010 % wt
LBP-06 *091721244-0006*	11/2/2017	11/4/2017 Site: EXAM ROOM DOOR	0.010 % wt	<0.010 % wt
LBP-07 *091721244-0007*	11/2/2017	11/4/2017 Site: FLOOR (BARBER)	0.010 % wt	<0.010 % wt
LBP-08 *091721244-0008*	11/2/2017	11/4/2017 Site: WALL	0.010 % wt	<0.010 % wt
LBP-09 *091721244-0009*	11/2/2017	11/4/2017 Site: REAR OF OPTOMETRY ON PIPE	0.010 % wt	<0.010 % wt
LBP-10 *091721244-0010*	11/2/2017	11/4/2017 Site: EXTERIOR REAR PIPE	0.010 % wt	<0.010 % wt
LBP-11 *091721244-0011*	11/2/2017	11/4/2017 Site: EXTERIOR WALL	0.010 % wt	0.020 % wt

Julian Neagu, Lead Laboratory Manager
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Analytical, Inc San Leandro, CA A2LA Accredited Environmental Testing Cert #2845.09

Initial report from 11/04/2017 17:48:59

EMSL Analytical, Inc
464 McCormick Street, San Leandro, CA 94577
Phone/Fax: (510) 895-3675 / (510) 895-3680
http://www.EMSL.com sanleandrolab@emsl.com

EMSL Order: 091721244
CustomerID: NOMO22
CustomerPO:
ProjectID:

Attn: **Blair Bridges**
Ninyo & Moore
1956 Webster
Suite 400
Oakland, CA 94612

Phone: (510) 633-5640
Fax: (510) 633-5646
Received: 11/03/17 11:15 AM
Collected: 11/2/2017

Project: **SAN ANSELMO**

Test Report: Lead in Paint Chips by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	Collected	Analyzed	RDL	Lead Concentration
LBP-12 *091721244-0012*	11/2/2017	11/4/2017 Site: OPTOMETRIST BATHROOM WALL	0.010 % wt	<0.010 % wt
LBP-13 *091721244-0013*	11/2/2017	11/4/2017 Site: KITCHEN	0.010 % wt	<0.010 % wt
LBP-14 *091721244-0014*	11/2/2017	11/4/2017 Site: BAR	0.010 % wt	<0.010 % wt
LBP-15 *091721244-0015*	11/2/2017	11/4/2017 Site: KITCHEN DOOR	0.010 % wt	<0.010 % wt
LBP-16 *091721244-0016*	11/2/2017	11/4/2017 Site: WINE AREA	0.010 % wt	<0.010 % wt
LBP-17 *091721244-0017*	11/2/2017	11/4/2017 Site: FLOOR IN WINE AREA	0.010 % wt	<0.010 % wt
LBP-18 *091721244-0018*	11/2/2017	11/4/2017 Site: INTERIOR WALL	0.010 % wt	<0.010 % wt

Julian Neagu, Lead Laboratory Manager
or other approved signatory

*Analysis following Lead in Paint by EMSL SOP/Determination of Environmental Lead by FLAA. Reporting limit is 0.010 % wt based on the minimum sample weight per our SOP. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities. Samples received in good condition unless otherwise noted. "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Analytical, Inc San Leandro, CA A2LA Accredited Environmental Testing Cert #2845.09

Initial report from 11/04/2017 17:48:59

OrderID: 091721244

LEAD BASED PAINT BULK SAMPLE DATA SHEET

3day TAT   091721244   Page 1 of 1

Ninyo & Moore 1956 Webster Street Oakland, CA 94612 Tel: 510 343 3000	San Anselmo Project No.: Project Manager: Blair Bridges/Bill Larkin Site Address: San Anselmo	Sampled By: Blair Bridges Sampled By: Sampled By: Date Sampled: 11/2/17	Laboratory: EMSL

CHAIN OF CUSTODY INFORMATION:

Relinquished By: (sign/print)	Company	Date	Time(24 hr.)	Received By: (sign/print)	Laboratory
BBridges /Blair Bridges	Ninyo&Moore	11/3/17	1110	/	
/		11/3/17	11:15AM WI	[signature] / TR	

Sample ID	Building	Sample Location	Building Component	Sample Description (Color /# Layers /Substrate)	Estimated Surface Area	Condition
LBP-01	634	Above ceiling on upper ceiling (RE)	Ceiling	white/2/metal	600SF	Non-intact
LBP-02	↓	Bathroom Floor (RE)	Floor	Beige 12" CT	30SF	Intact
LBP-03		Entryway (")	"	Black 12" CT	15 SF	↓
LBP-04		Bathroom (")	wall	olive green/2/wallboard	900SF	
LBP-05		" (optometry)	Floor	12" Beige CT	70 SF	
LBP-06		Exam Room Door (")	Door Frame	white/2/wood	150SF	
LBP-07		Floor (Barber)	Floor	12" white CT	180SF	
LBP-08		wall	wall	Brownish Red/2/wallboard	300SF	
LBP-09	↓	Rear of Optometry on Pipe	Pipe	Dark Green/2/metal		
LBP-10	636	Exterior Rear Pipe	Pipe	↓		
LBP-11	630	" Wall	Wall	Dark Green/2/concrete		
LBP-12	634	Optometrist Bathroom Wall	"	cream/2/wallboard	400SF	
LBP-13	636	Kitchen	Floor	Brownish-Red 5" CT	450SF	
LBP-14		Bar	"	Gray 5" CT	25SF	
LBP-15		Kitchen Door	Door Frame	white/2/wood	170 SF	
LBP-16	↓	Wine Area	Wall	Brownish light Yellow/2/wallboard	700SF	
LBP-17	636	Floor in Wine Area	Floor	Gray/2/Concrete	600 SF	↓
LBP-18	630	Interior Wall	wall	white/2/concrete	400SF	↓

Paint Chip Sample COC

APPENDIX D

CDPH Form 8552 – Lead Hazard Evaluation Report

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation 11/2/2018

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
634 San Anselmo Avenue	San Anselmo	Marin	94960

Construction date (year) of structure	Type of structure	Children living in structure?
	☑ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☐ Other______	☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
County of Marin	(415) 473-7579

Address [number, street, apartment (if applicable)]	City	State	Zip Code
3501 Civic Center Drive, Suite 304	San Rafael	CA	94903

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

☐ No lead-based paint detected ☐ Intact lead-based paint detected ☑ Deteriorated lead-based paint detected

☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other______

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
David Blair Bridges	5107157224

Address [number, street, apartment (if applicable)]	City	State	Zip Code
1956 Webster St, #400	Oakland	CA	94612

CDPH certification number	Signature	Date
24052	B Bridges	11/8/2017

Name and CDPH certification number of any other individuals conducting sampling or testing (if applicable)

Section 7 — Attachments

A. A foundation diagram or sketch of the structure indicating the specifc locations of each lead hazard or presence of lead-based paint;
B. Each testing method, device, and sampling procedure used;
C. All data collected, including quality control data, laboratory results, including laboratory name, address, and phone number.

First copy and attachments retained by inspector

Second copy and attachments retained by owner

Third copy only (no attachments) mailed or faxed to:

California Department of Public Health
Childhood Lead Poisoning Prevention Branch Reports
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

LEAD HAZARD EVALUATION REPORT

Section 1 — Date of Lead Hazard Evaluation 11/2/2018

Section 2 — Type of Lead Hazard Evaluation (Check one box only)

☑ Lead Inspection ☐ Risk assessment ☐ Clearance Inspection ☐ Other (specify) ______

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
630 San Anselmo Avenue	San Anselmo	Marin	94960

Construction date (year) of structure:

Type of structure: ☐ Multi-unit building ☐ School or daycare ☐ Single family dwelling ☑ Other Art Studio

Children living in structure? ☐ Yes ☑ No ☐ Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name		Telephone number	
County of Marin		(415) 473-7579	
Address [number, street, apartment (if applicable)]	**City**	**State**	**Zip Code**
3501 Civic Center Drive, Suite 304	San Rafael	CA	94903

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☐ No lead hazards detected ☐ Lead-contaminated dust found ☐ Lead-contaminated soil found ☐ Other______

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1956 Webster St, #400	Oakland	CA	94612
CDPH certification number	**Signature**		**Date**
24052	B Bridges		11/8/2017

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[✓] Lead Inspection [ ] Risk assessment [ ] Clearance Inspection [ ] Other (specify) ______

Section 3 — Structure Where Lead Hazard Evaluation Was Conducted

Address [number, street, apartment (if applicable)]	City	County	Zip Code
636 San Anselmo Avenue	San Anselmo	Marin	94960

Construction date (year) of structure	Type of structure	Children living in structure?
	[ ] Multi-unit building [ ] School or daycare [ ] Single family dwelling [✓] Other Restaurant	[ ] Yes [✓] No [ ] Don't Know

Section 4 — Owner of Structure (if business/agency, list contact person)

Name	Telephone number
County of Marin	(415) 473-7579

Address [number, street, apartment (if applicable)]	City	State	Zip Code
3501 Civic Center Drive, Suite 304	San Rafael	CA	94903

Section 5 — Results of Lead Hazard Evaluation (check all that apply)

[✓] No lead-based paint detected [ ] Intact lead-based paint detected [ ] Deteriorated lead-based paint detected

[✓] No lead hazards detected [ ] Lead-contaminated dust found [ ] Lead-contaminated soil found [ ] Other______

Section 6 — Individual Conducting Lead Hazard Evaluation

Name	Telephone number
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1956 Webster St, #400	Oakland	CA	94612

CDPH certification number	Signature	Date
24052	B Bri[signature]	11/8/2017

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850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804-6403
Fax: (510) 620-5656

TRANSMISSION VERIFICATION REPORT

TIME : 11/08/2017 12:50
NAME : NINYO MOORE
FAX : 4159830171
TEL :
SER.# : BROH5J323279

DATE,TIME	11/08 12:49
FAX NO./NAME	6205656
DURATION	00:01:06
PAGE(S)	04
RESULT	OK
MODE	STANDARD ECM

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

1956 Webster Street, Suite 400 | Oakland, California 94612 | p. 510.343.3000

SAN DIEGO | IRVINE | LOS ANGELES | FONTANA | OAKLAND | SAN FRANCISCO | SACRAMENTO

SAN JOSE | PHOENIX | TUCSON | PRESCOTT | LAS VEGAS | DENVER | BROOMFIELD | HOUSTON

www.ninyoandmoore.com

Former Nursery Detention Basin Project

Geotechnical Report

Fairfax, California

Submitted to:
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
P.O. Box 4186
San Rafael, CA 94913

Submitted by:
GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400
Rancho Cordova, CA 95670
96-631-4500

March 2017

Project 1610277

Robert Jaeger, Ph.D., P.E.
Senior Engineer

Graham Bradner, P.G., C.E.G. C.HG.
Senior Engineering Geologist

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1. Introduction

1.1 Program Overview

GEI Consultants Inc. (GEI) is assisting the Marin County Flood Control and Water Conservation District (District) in a preliminary geotechnical evaluation of the Former Nursery Detention Basin Project (Project) site located in Fairfax, CA (Figure 1-1). The overall goal of the Project is to provide temporary storage of floodwaters for peak flow attenuation on Fairfax Creek. The geotechnical evaluation described herein is based on site-specific information on the soil and groundwater conditions at the site.

1.2 Purpose and Scope

The preliminary plan for the detention basin includes excavation of the site to lower the ground elevation, and construction of an earthen dike on the downstream (eastern) boundary. A diversion structure and outlet structure would be constructed in Fairfax Creek to regulate and control stream flows. GEI has reviewed background documentation and completed geotechnical explorations within the former nursery as part of an assessment of the current conditions at the project site. The purpose of the explorations was to obtain information on environmental and geotechnical subsurface conditions and refine soil properties for engineering analyses. The results of the geotechnical explorations and environmental testing are documented in the *Field Investigation Report* (FIR), submitted as draft to the District in December 2016 (GEI, 2016).

This Geotechnical Report (GR) includes a review of geologic and geotechnical conditions, an assessment of project feasibility, and preliminary design recommendations and considerations for further project development. The assessment is based on the proposed flood detention basin design concept provided by the District on September 8, 2016. The GR contains:

- A summary of geotechnical conditions, geologic hazards, and groundwater conditions at the site,
- Soil characteristics for potential for reuse as embankment fill, including geotechnical properties, environmental constituents, and suitability,
- A preliminary evaluation of project fill requirements and borrow availability,
- Geotechnical analyses of the proposed basin concept, including seepage analysis, stability analyses for steady-state seepage, rapid drawdown, post-seismic, and pseudostatic conditions, and seismic deformation analyses.

2. Site Conditions

2.1 Project Location and Site Description

The Former Nursery Detention Basin site is a seven acre parcel previously used as a growing grounds for a retail landscaping nursery. Existing structures at the site include a 942 square foot (SF) sales office, 10,400 SF of shade structures, an 800 SF residence, 1,748 SF art gallery/studio, a well and water tank, a Marin Municipal Water District water service, and a septic tank system. Fairfax Creek flows from west to east in an incised natural channel at the southern boundary of the property (Figure 2-1). The center portion of the property is relatively flat, sloping gently from west to east. The northern portion of the parcel is a steep hillside. Typical ground surface elevations within the property range from about El. 238 ft on the western edge to 230 ft on the eastern edge. Fairfax Creek is incised an additional six to eight feet below the central portion of the property. The northern hillslope climbs steeply for several hundred feet. The site is accessed across a bridge over Fairfax Creek from Sir Francis Drake Blvd.

2.2 Site Geology

The project site is situated in the Coast Range province, along an east-west trending valley flanked to the north and south by relatively steep hillsides. According to Blake (2000), the hills are Franciscan Complex, and appear to consist of variably deformed Cretaceous sandstone and shale (see Photo 1) on the lower slope, with mélange and Serpentinite on the upper slope, as shown on Figure 2-2. The valley floor is filled with Quaternary alluvial and colluvial sediments of uncertain depths, which underlie the project site. The alluvial sediments thin and pinch out or merge with Quaternary hillside slope deposits at the edges of the valley.

Photo 1. Exposure of weathered Franciscan Complex from northern hillslope adjacent to Former Nursery site.

2.3 Subsurface Conditions

2.3.1 Soil Conditions

Subsurface conditions within the project extents are discussed below based on site reconnaissance and recent GEI explorations. Data collection details and methods are further discussed in Section 3 of the FIR (GEI, 2016). As described in the FIR, the recently performed exploration program consisted of six borings distributed across the site and on Sir Francis Drake Blvd (Figure 2-1). Three of the borings were converted to monitoring wells, which were outfitted with datalogging transducers to measure and record groundwater level measurements.

A geologic cross-section traversing the site was prepared based on existing conditions (Figure 2-3). The subsurface conditions within the site consist of interbedded layers of gravel, sand, silt, and clay sediments extending beyond the depths explored in the central portion of the site, but overlying bedrock near the flanks of the valley. As depicted on cross-section, the foundation generally consists of four zones – three alluvial deposits underlain by bedrock. The upper zone is about 5 ft thick consisting of loose to medium dense clayey and silty sand. The intermediate zone is very soft to very stiff lean clay, and varies from approximately 10 feet in the middle of the site to 20 feet on the east side of the site. The deeper alluvial zone is medium dense to very dense clayey sand and gravel. Claystone bedrock and clay with relic rock structure was encountered in the site investigations near the flanks of the valley. SPTs attempted in the claystone found it to be very hard (50 blows over a 4-inch drive and 50 blows over a 2-inch drive).

Although not encountered in the site investigations, it is likely that unconsolidated alluvial deposits are present in the Fairfax Creek channel. These deposits could range from clay to gravel, depending on the source material and depositional history. The conditions in Fairfax Creek should be further evaluated as part of detailed design.

2.3.2 Groundwater Conditions

Groundwater was not encountered during the field investigation program, which was performed in early-August 2016. However, as shown Figure 2-4, groundwater levels at the site increased through the fall and winter seasons, corresponding to significant increases in precipitation.

The monitoring wells were installed on August 4 & 5, 2016, with the bottom of the well screens at about 19.0 to 20.0 ft below ground surface (i.e. about El. 214 ft). No groundwater was present at the time of installation. The transducers were installed on November 23, 2016, at which time the groundwater was measured at about 8.5 to 9.0 ft below ground surface (i.e. about El. 224.5 to 225.5 ft). As shown on Figure 2-4, about 11 inches of precipitation had fallen in the area, which was followed by more substantial precipitation events. Consequently, groundwater levels have continued to increase in the monitoring wells. Since groundwater monitoring began in November 2016, levels have fluctuated between from a minimum of El. 224.3 ft at MW-3 located furthest downstream to a maximum of 233.6 ft at MW-1 located immediately adjacent to the northern hillside.

It is notable that the general groundwater flow regime during non-precipitation periods is different than during storm events. During non-precipitation periods, the highest values are observed in MW-2, which is closest to Fairfax Creek and furthest upstream indicating recharge from Fairfax Creek. However, during precipitation events, groundwater levels in MW-1 increase significantly rising to within a foot of the ground surface during the monitoring period, indicating recharge from the steep hills on the northern side of the property immediately adjacent to MW-1.

As described above, groundwater levels fluctuate at the site likely in response to precipitation, and that groundwater levels measured in the monitoring wells are at times above the floor of the proposed detention basin. However, based on review of site stratigraphy, it appears that the potentially water-bearing alluvial strata beneath the site is a unit of clayey sand and gravel, which is overlain by an intermediate lean clay layer. The floor of the detention basin would be positioned at El. 224 ft, which is mid-depth in the intermediate lean clay layer, thus providing a thickness of lean clay about five to eight feet thick below the bottom of the basin. Additionally, if water is shedding off of the adjacent northern slope during precipitation events, it is likely to be shallow baseflow through the Franciscan Complex bedrock which could connect with the surficial silty/clayey sand. The described soil types are unlikely to have hydraulic conductivities capable of producing quantities of water that would affect the performance of the basin. It is probable that seepage or surface runoff would enter the basin during the winter and spring months, but the quantity of water could likely be managed through surface contouring to promote drainage within the basin. Additional investigations and testing are recommended to better understand the deeper stratigraphy of the alluvial deposits and the properties of the adjacent hillslope to confirm this condition.

2.4 Geologic Hazards

Potential geological hazards such as landslides and fault rupture were assessed qualitatively using available information, and based on site reconnaissance performed on July 19, 2016, and will further discussed in the following sections. Analysis of additional geotechnical conditions, such as seepage, stability, liquefaction potential, and seismic deformation are discussed in Section 4.0 of this report.

2.4.1 Landslides

A landslide occurring on the slopes bordering the project site could impact the detention basin by damaging the earthen dikes, or if the basin contains water when a landslide occurs, by creating a wave that could overtop the downstream embankments. Landslide potential was assessed using the mapping developed Smith, Rice, and Strand titled *Geology of the Upper Ross Valley and the Western Part of the San Rafael Area, Marin County, California* (Smith et al, 1976), which has been annotated to make interpretation of the maps more readable for those features relevant to the detention basin site (Figure 2-5). The inventory summarizes evidence of historic landslide activity in terms of:

- Debris flow landslides, which are unconsolidated and unsorted soil and rock debris (colluvium) that has moved downslope by flow or creep processes.
- Block slump landslides, which are masses of bedrock [or soil] that have moved downslope by rotational or translational slip along a planar surface.
- Slopes exhibiting evidence of downslope creep.
- Small landslide deposits and debris avalanche scars too small to be delineated on the map.

The mapping and site reconnaissance demonstrates some evidence of slope creep on the hillslope bordering the northern side of the property, which is within areas underlain by Franciscan mélange. The movement could be due to either debris flow or surface creep, but large-scale rotational block landslides were not apparent. No significant cracking was observed during reconnaissance of the site, however, small-scale headscarps were noted adjacent to the access road. It is possible that saturated conditions along the hillside could trigger movement. Based on the observed landslide history in the site vicinity, the uncertain nature of Franciscan mélange deposits, and the significant amount of recharge that appears in MW-1 during storm events, there is moderate risk of slope instability.

2.4.2 Fault Rupture

Both the California Geological Survey and Caltrans fault mapping resources were used to determine if active faults pass through the site. Several major faults have been identified in the region, including the San Andreas, Hayward, and Rodgers Creek faults. However, no active faults are in the immediate project area (Figure 2-6). The California Division of Mines and Geology (CDMG) has prepared Alquist-Priolo Fault Zone and Seismic Hazard Maps to reduce losses from surface fault rupture on a statewide basis. The proposed detention basin site is not located within a Special Studies Zone. Therefore, the potential for fault surface rupture at the sites is remote.

The site will experience seismic ground shaking similar to other areas in the seismically active Bay Area. The fault likely to cause the greatest seismic activity is the San Andreas (North Coast) fault. This fault is approximately 10.8 km (6.7 miles) from the project site, and is believed to be capable of producing a magnitude 8.0 earthquake. The intensity of ground shaking will depend on the magnitude and duration of the earthquake. Potential geotechnical hazards such as liquefaction, seismic deformation, and seismic induced settlement will be further evaluated in Section 4.0 of this report.

2.5 Environmental Soil Testing

As part of the field investigation program documented in the FIR, GEI collected samples and assigned laboratory testing for contaminants within potential borrow materials. Soil samples collected at the site were tested for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs), organochlorine pesticides, polychlorinated biphenyls (PCBs), and heavy metals. According to the results of laboratory testing, there were some low detections of VOCs, SVOCs, and organochlorine pesticide constituents at the site, but none exceeded the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, rev. 3, February 2016 (ESLs). Metals concentrations were generally consistent across the site, with slightly elevated levels of arsenic, chromium, and nickel above the ESLs. However, these metals are common to the region and typical of background values. Therefore, the on-site soils does not appear to pose a hydrological hazard if used as embankment fill material. Based upon soil analytical results, constituent concentrations are less than the Total Limit Threshold Concentration (TTLC) values as defined in California Code of Regulations 22 §66261.24 Characteristics of Toxicity, and would therefore be considered non-hazardous. However, some of the metals concentrations are slightly elevated, such that off-site disposal of soil excavated at the site may require a Class II landfill accepting “designated” soils. This should be further evaluated based on supplemental environmental testing of borrow soil at the site.

3. Project Conceptual Layout

The conceptual layout of the Former Nursery Detention Basin is shown on Figure 3-1. The grading shown on the figure was based on the District's conceptual figure provided to GEI on September 8, 2016. The preliminary plan for the detention basin includes excavation in the central portion of the site to lower the ground to El. 224 ft, and construction of an earthen dike on the downstream (eastern) boundary with a crest elevation of 238 ft. The natural ground in the vicinity of the embankment is at approximately El. 230 ft, so the structure would be eight feet tall on the downstream side. Natural ground on the western (upstream) side of the basin, high ground on the northern side, and the right (south) bank of Fairfax Creek, which abuts Sir Francis Drake Blvd, complete the perimeter impoundment. A floodwall along the right bank of Fairfax Creek with a top elevation of 238 ft will be needed to maintain the basin crest elevation. A diversion structure and outlet structure would be constructed in Fairfax Creek to regulate and control stream flows. Fairfax Creek is incised down to an elevation of about 225 ft, so the diversion structure would have a height of 13 feet tall. The conceptual design includes a concrete spillway at El. 235 ft.

It is our understanding that the near-surface soils within the basin are being considered for potential use as borrow materials. For the proposed basin configuration, the estimated volume of soil to be excavated is 33,000 CY and the amount of fill required to construct the downstream berm is 11,500 CY. Assuming the upper 12 inches of existing soil will be removed and not considered for borrow due to organics and 30% shrinkage, the available borrow volume was calculated to be sufficient, but will need to be confirmed as design progresses.

4. Geotechnical Evaluation

Geotechnical analyses for evaluation of the proposed basin included:

- Seepage and stability analyses,
- Liquefaction susceptibility and triggering evaluations,
- Estimation of post-seismic reconsolidation settlements, and
- Seismic deformation analyses.

The analyses were performed at two analysis cross sections representing the maximum sections of the downstream dike and the dam/spillway section (Figures 4-1 and 4-2). The locations of the cross sections are shown on Figure 3-1. The analysis approach, analysis criteria, parameters, and design input ground motions are presented in the following sections.

4.1 Analysis Sections and Stratigraphy

Two cross sections were developed for analysis of the downstream berm of the proposed basin, as shown in Figures 4-1 and 4-2. Characterization of the subsurface conditions was performed by evaluating the site geology and the results of subsurface explorations and laboratory testing. Review of available information indicated the foundation generally consists of four zones:

- Zone 1: Upper zone consisting predominantly of silty to clayey sand, with some clayey gravel. This zone was encountered between El. 234 and El. 225 (NAVD 88) in explorations MW#1, MW#2, MW#3, SB#2, and SB#3. The fines contents measured from seven tests on samples from Zone 1 ranged from 15 to 38%, with an average of about 28%. The plasticity index (PI) measured from two tests on samples from Zone 1 were either non-plastic (NP) or 7. SPT energy-corrected blow counts (N_{60}) in Zone 1 ranged from 5 to 40, with an average of about 15.

- Zone 2: Intermediate zone consisting predominantly of lean clay, with limited intervals of high-plasticity clay and high-fines SC-SM (47% fines). This zone was encountered between El. 225 and El. 207 (NAVD 88) in explorations MW#1, MW#2, MW#3, SB#1, and SB#2. The fines contents measured from three tests on samples from Zone 2 ranged from 47 to 61%, with an average of about 55%. The plasticity index (PI) measured from seven tests on samples from Zone 2 ranged from 7 to 13, with an average of about 10. SPT energy-corrected blow counts (N_{60}) in Zone 2 ranged from 0 to 46, with an average of about 16. The higher blow counts were encountered near bottom of the unit in close proximity to the underlying bedrock.

- Zone 3: Deep zone consisting predominantly of clayey sand and clayey gravel. This zone was encountered between El. 218 and El. 201 (NAVD 88) in explorations MW#2, MW#3, and SB#1, which are closer to the middle of the valley. The borings near the edges of the valley (MW#1 and SB#2) did not encounter Zone 3 materials before encountering claystone bedrock or lean clay with rock structure. The fines contents measured from three tests on samples from Zone 3 ranged from 14 to 20%, with an average of about 17%. The plasticity index (PI) measured from three tests on samples from Zone 3 ranged from 9 to 26, with an average of about 16. SPT energy-corrected blow counts (N_{60}) in Zone 3 ranged from 15 to 21, with an average of about 19.

- Zone 4: Claystone bedrock encountered beginning at El. 217.5 in boring MW#1. Boring SB#2 encountered a sample of lean clay with rock structure at the bottom of the borehole, but did not encounter claystone. Two SPTs were attempted in claystone in boring MW#1; however, refusal was encountered on both attempts (50 blows over a 4-inch drive and 50 blows over a 2-inch drive).

The stratigraphy shown on Figures 4-1 and 4-2 is idealized based on the materials encountered during subsurface investigations superimposed on the basin conceptual layout (Figure 3-1). The finished topography shown on the concept plan was used for development of analysis cross sections. It is assumed that the upper portion of the foundation within the basin limits will be excavated and reused for embankment fill. As such, the material properties for the embankment are based on materials described above for Zone 1, but assumed to be reworked, homogenized, and placed under controlled conditions. The seepage and stability analyses described herein do not include Zone 1 or Zone 4, since Zone 1 does not appear to extend beneath the embankment (see boring SB-1), and Zone 4 is bedrock assumed to have little impact on the geotechnical performance of the embankment. Additional investigations are recommended beneath the footprint of the embankment to verify the subsurface conditions and better evaluate the extent of Zone 1 deposits at the site.

4.2 Criteria

The following table summarizes the design criteria for seepage and slope stability analyses for the proposed basin. These values were selected based on criteria from USACE EM 1110-2-1902 (2003) and DSOD, as published in “Strength of Materials for Embankment Dams” (USSD, 2007). As indicated in the table below, no safety factor criterion is applied to pseudostatic analysis as it is only used to estimate the yield acceleration for use in seismic deformation analyses.

Analysis Type	Criterion
Steady-State Seepage	Exit gradient, i = 0.50 at the downstream toe
Steady-State Stability	Factor of safety, FS = 1.5
Rapid Drawdown Stability	Factor of safety, FS = 1.3
Post-Seismic Stability	Factor of safety, FS = 1.1
Pseudostatic Stability	N/A

4.3 Seepage and Stability Analyses

4.3.1 Analysis Approach and Analysis Cases

Seepage and stability analyses were performed using software developed by GEO-SLOPE International, Ltd. SEEP/W is a two-dimensional finite element analysis computer program that was used to generate steady-state phreatic surfaces and pore water pressures within the embankment and foundation soils for the design water surface at El. 236 ft (NAVD 88). Stability analyses were performed with SLOPE/W, using the Spencer analysis method, which satisfies both moment and force equilibrium. Slip surfaces were defined using the entry-and-exit method. Stability analyses were performed on the same analysis cross sections evaluated for seepage.

For the steady-state stability case, it is assumed the proposed basin is filled to the design water surface elevation (El. 236 ft, NAVD 88) and the water surface elevation remains constant long enough to establish steady-state seepage conditions through the embankment, in accordance with USACE EM 1110-2-1902 guidelines. The phreatic surfaces and pore water pressures from our seepage analyses were used in the stability evaluations. Drained strengths were assigned to all soils in these analyses as steady-state seepage is a long-term condition.

For the rapid drawdown case, it is commonly assumed the embankment has been saturated for a sufficient length of time under the design water level to develop steady-state seepage conditions, followed by rapid drawdown of the basin. It is also assumed that excess pore pressures during drawdown would not develop in coarse-grained soils because these materials are relatively free-draining. Fine-grained soils were assumed to be non-free-draining and would generate excess pore pressures during loading.

The Improved Method for Rapid Drawdown was used as outlined in Appendix G of EM 1110-2-1902 (USACE, 2003) to evaluate the rapid drawdown case. This method of evaluating rapid-drawdown stability assumes that the water level drops instantaneously from the design water level to the bottom of the basin at El. 224 ft (NAVD 88), resulting in instantaneous excess pore pressure development in the embankment and foundation soils that is directly proportional to the assumed water level drop. In reality, the water level recedes gradually, and some pore pressure dissipation occurs as the water level drops. As a result, the rapid drawdown analysis is generally considered to be inherently conservative.

4.3.2 Seepage Analysis Parameters

Hydraulic conductivities for seepage analyses were selected for each soil type based on material index properties, laboratory and in-situ testing by DWR (2015), and review of relevant geotechnical references. Hydraulic conductivities were developed for each material type encountered within the basin. A summary table of horizontal and vertical hydraulic conductivities for each material type is provided below.

Material Type	k_v (cm/sec)	k_h/k_v	k_h (cm/sec)
SC (Embankment)	4.0E-06	4	1.6E-05
CL	2.5E-06	4	1.0E-05
SC (Foundation)	4.0E-05	4	1.6E-04

The hydraulic conductivity for the clayey sand (SC) embankment material was based on typical values for controlled placement of the excavated material to be used as berm fill. The clay (CL) in the foundation was assumed to not be intact due to possible penetrations during previous use of the site. Hydraulic conductivity for the clay was selected based on typical values for natural, damaged deposits. For the sandy (SC) foundation material below the clay, hydraulic conductivities selected were based on typical values for natural deposits with similar fines content.

4.3.3 Slope Stability Analysis Parameters

Soil strength parameters for slope stability analyses were selected for each layer. Strength parameters vary based on a number of factors such as material type, relative density, overconsolidation, and plasticity. Unit weights for each soil strata were selected based on blow counts and typical ranges for each soil type.

In selecting strength parameters, distinction was made between coarse-grained materials and fine-grained materials. Coarse-grained materials are defined as soils with fines contents less than 50%. Fine-grained soils are defined as soils with fines contents of 50% or more. The approaches for strength parameter selection are described below and illustrated on the plots included in Appendix A.

4.3.3.1 Coarse-Grained Soils

The drained friction angle (φ') for coarse-grained materials was estimated with the Hatanaka and Uchida (1996) relationship with normalized SPT blowcounts:

$$\varphi' = \sqrt{15.4 \times (N_1)_{60}} + 20°$$

The berm fill (Layer 1) will be placed using modern construction techniques and would be constructed with a high-level of compaction. Foundation layer 3 (SC) was also found to be dense based on SPT blowcounts in the layer. Based on the density of these layers, these materials are expected to dilate when sheared. Therefore, the undrained strengths of the coarse-grained soils were conservatively taken as the drained strengths.

4.3.3.2 Fine-Grained Soils

The maximum past pressure for fine-grained material was estimated using a relationship between SPT blowcounts (N_{60}) and maximum past pressure (σ'_p) by Kulhawy and Mayne (1990):

$$\sigma'_p = 0.47 N_{60} P_a,$$

where P_a is atmospheric pressure. Based on the range of σ'_p estimated using this relationship, a maximum past pressure of 4 ksf was selected for use in characterizing the fine-grained layer present in both analysis cross sections (Layer 2).

The drained cohesion (c') was calculated based on recommendations in the Urban Levee Evaluations Guidance Document for Geotechnical Analyses (DWR, 2015) for foundation CL soils:

$$c' = 0.015\sigma'_p.$$

Using this relationship with the estimated maximum past pressure of 4 ksf, a c' of 60 psf was calculated and rounded to the nearest 25 psf (c' = 50 psf was selected for Layer 2).

The drained friction angle for fine-grained materials was estimated using the relationship between φ' and PI by Terzaghi et al. (1996). A lower third φ' value of 30° was selected from the relationship using the average PI of the layer (average PI = 10 for Layer 2).

The undrained strength (s_u) of the fine-grained layer was estimated from SPT blowcounts using a correlation from Terzaghi et al. (1996) between undrained strength, N_{60}, and PI. For Layer 2 with an average PI of 10, the relationship can be written as:

$$s_u = 115 N_{60} \text{ (psf)}$$

Based on the SPT blowcounts in Layer 2, an undrained shear strength of 1000 psf was conservatively selected for analysis. Undrained strengths were also estimated from pocket penetrometer measurements performed during the field explorations. The undrained strength was estimated as the pocket penetrometer measurement divided by two per Blum (1997). Comparison of the undrained strengths estimated with the SPT correlation and the pocket penetrometer indicated the pocket penetrometer strengths were typically greater than or equal to the SPT-estimated strengths, with relatively few exceptions.

4.3.4 Results from Seepage and Stability Analyses

Seepage and slope stability analyses results are summarized in Table 4-1. Analysis result figures are presented in Appendix B. For each cross section, the seepage analysis results are illustrated by figures that show the seepage model with soil layering and parameters, and a total head plot for design water surface elevation. Likewise, for each cross section the stability analysis results are presented on figures that show soil stratigraphy, parameters, and the critical failure surfaces with corresponding factors of safety for each analysis case.

The results from the seepage and stability analyses indicate the proposed configuration for the downstream berm meets criteria for seepage and slope stability, as described in Section 4.2.

4.4 Seismic Stability and Deformation Analyses

4.4.1 Design Input Ground Motions

Deterministic ground motion acceleration response spectra (ARS) were calculated for the project site using the geometric average of all five NGA West2 Ground Motion Prediction Equations (GMPEs), where each GMPE was equally weighted. A site V_{s30} of 620 m/s was estimated using the USGS V_{s30} map server online (USGS, 2017). The Caltrans ARS Online tool (Caltrans, 2017) was used to characterize fault parameters and to calculate source-to-site distances.

The controlling seismic source was identified as the San Andreas fault – North Coast Section, which has a moment magnitude of 8.0 and is located approximately 11 km away from the site. The San Andreas fault has an estimated slip rate of 24 mm per year (Field et al. 2013), which is characterized as a very high slip rate (greater than 9.0 mm/year) per the Department of Water Resources' Division of Safety of Dams (DSOD) Consequence-Hazard Matrix (DSOD, 2002). The proposed basin as shown in the concept configuration would impound up to 11 ft of water in the creek channel, and would therefore be DSOD jurisdictional structure. The structure would not be classified as Low Consequence since it is located upstream of residential communities. Therefore, based on the DSOD Consequence Hazard Matrix, deterministic 84th percentile ARS will be required by DSOD. The deterministic 84th percentile PGA for the controlling seismic source was 0.69g. The deterministic 84th percentile ARS curves are provided in Appendix C. The controlling seismic source, fault parameters, source-to-site distance, and 84th percentile peak ground acceleration are also presented below.

Fault Parameters				Site Parameters	
Name	Fault Type	Dip (deg)	M_w	R_{RUP} (km)	84th Percentile PGA (g)
San Andreas (North Coast Fault)	SS	90	8.0	10.8	0.69

4.4.2 Liquefaction Susceptibility and Triggering

Liquefaction describes the loss of shear strength in saturated soils as a result of pore pressure increasing due to ground shaking. Liquefaction typically occurs in saturated near-surface soil layers consisting of poorly graded loose sands and gravels, non-plastic silts, and low plasticity clays. Liquefaction susceptibility of the foundation soils was evaluated using the Idriss and Boulanger (2008) criteria based on fines content and PI. According to their criteria, fine-grained soils (50% or more fines) with PI ≥ 7 are considered to behave clay-like and are not susceptible to liquefaction-related strength loss. Soils not meeting these criteria are classified as sand-like and require a liquefaction triggering evaluation to estimate the potential for liquefaction at the design seismic input ground motions. Results from the liquefaction susceptibility screening analysis are summarized below and in Table 4-2.

- Zone 1 fines contents and PIs indicate that the material will exhibit sand-like behavior as described in Section 3.2.2. However, this zone will be excavated and used as borrow for the proposed embankment. Therefore, this layer was not included in the seepage and stability models as a foundation material. If this material is encountered during design of the downstream berm, additional analyses should be performed to determine appropriate actions.

- Zone 2 fines contents and PIs indicate that the material will exhibit clay-like behavior, and is judged to not be susceptible to liquefaction triggering. Within this zone, a single sample had fines content slightly less than 50% (47%) and a PI of 7. Although the fines content of this sample falls just below the liquefaction susceptibility criteria by Idriss and Boulanger (2008), this material will likely exhibit clay-like behavior. Therefore, Zone 2 was judged to be not susceptible to liquefaction.

- Zone 3 fines contents and PIs indicate that the material will generally exhibit sand-like behavior, and is judged to be susceptible to liquefaction triggering during a seismic event.

Liquefaction triggering analyses were performed for all borings presented in the FIR. Liquefaction triggering evaluations were performed according to the methods recommended by Idriss and Boulanger (2008), with updates per Boulanger and Idriss (2014). The potential for liquefaction triggering is evaluated using SPT blow counts to estimate a cyclic resistance ratio (CRR), or cyclic strength, in sand-like soils. The cyclic loading due to the design input ground motions is characterized as a cyclic stress ratio (CSR). The potential for liquefaction is evaluated by calculating a factor of safety against liquefaction (FS_L) as the ratio of the CRR to the CSR.

As discussed in Section 4.4.1, the deterministic 84th percentile design seismic loading (PGA of 0.69g, magnitude 8.0) were used for the analyses. The analyses assumed the basin is filled to the design water surface elevation (El. 236) by specifying a depth to the water table at design of 0.0 feet in the analyses. A factor of safety against liquefaction triggering (FS_L) of 1.4 was used to identify materials where liquefaction was expected to occur. Intervals with FS_L greater than or equal to 1.4 would not be expected to trigger liquefaction due to the design earthquake loading, whereas intervals with FS_L less than 1.0 would be expected to trigger liquefaction for the design earthquake loading. Intervals with FS_L between 1.0 and 1.4 were not expected to trigger liquefaction, but may incur some build-up of excess pore pressures during cyclic loading. For the present feasibility-level analyses, intervals with FS_L less than 1.4 were considered to trigger liquefaction.

The liquefaction triggering evaluations indicate the factors of safety against liquefaction (FS_L) between 0.2 and 0.6 in Zone 3 and thus liquefaction triggering is expected in Zone 3 (Appendix D). These values are lower than the liquefaction threshold criteria ($FS_L = 1.4$) and therefore some liquefaction should be anticipated at the site for the design earthquake. However, the $(N_1)_{60cs}$ values are very high and indicate the materials are prone to cyclic mobility but not strength loss. Cyclic mobility, as described in Youd et al. (2001) and MSHA (2009), is a progressive softening of dense materials where increased cyclic shear strains may develop, but the tendency of these materials “to dilate during shear inhibits major strength loss and large ground deformations.” Additionally, given the depth of Zone 3, it is unlikely to impact embankment stability.

Seismic induced settlement can occur with soils above the water table where looser zones are densified effectively decreasing void space between soil particles. Seismically induced settlement was evaluated by reviewing layer densities, thicknesses and continuity. During significant ground motions, expected settlements would likely be minimal and localized where thicker layers of sandy soil exist. Vertical reconsolidation settlement due to cyclic loading was calculated for all six borings using the procedures by Idriss and Boulanger (2008) (Appendix D). The vertical reconsolidation settlements were estimated to be negligible (0.3 ft or less). Based on the site-specific explorations by GEI, settlement caused by ground shaking does not pose a significant hazard to the site.

4.4.3 Seismic Deformation

Post-seismic stability analyses evaluate the potential for slope instabilities considering undrained strengths (where applicable) and potential strength loss in soils where liquefaction is estimated to trigger. Post-seismic stability was performed with undrained strengths from the pseudo-static analyses to account for potential strength loss due to excess pore pressure generation. Where applicable, residual undrained strengths were applied to materials where liquefaction-induced strength-loss was expected.

For the pseudostatic case, it is assumed that an earthquake causes an additional horizontal force in the direction of failure. This horizontal force is represented by a static force equal to the weight of the sliding soil mass multiplied by a seismic coefficient. The horizontal yield acceleration (k_y) represents the minimum horizontal acceleration required to produce a factor of safety equal to 1.0. The values of k_y for the berm slopes were computed using staged pseudostatic analysis in SLOPE/W, where undrained strengths are calculated using the same approach as described above for rapid drawdown. However for these analyses, the undrained strengths were reduced to 80% of the static undrained strengths used in rapid drawdown to account for development of excess pore pressures during cyclic loading (Duncan et al. 2014).

Seismic deformations were estimated by a simplified semi-empirical predictive relationship for estimating permanent displacements developed by Bray and Travasarou (2007). Bray and Travasarou analyzed 688 recorded strong-motion records from 41 earthquakes to estimate Newmark-type displacement. They chose earthquakes with a magnitude between 5.5 and 7.6, recorded at geotechnical sites B, C, or D (rock, soft rock, or deep stiff soil), and whose time histories in which the frequencies in the range of 0.25 to 10 Hz have not been filtered out.

Bray and Travasarou performed nonlinear coupled viscoelastic analyses with strain-dependent material properties to estimate the seismic displacements. From their analyses, Bray and Travasarou (2007) developed the following regression to estimate Newmark-type seismic deformations:

$$
\begin{aligned}
Ln(D) = &-1.10 - 2.83\ln(k_y) - 0.333\left(\ln(k_y)\right)^2 + 0.566\ln(k_y)\ln\left(S_a(1.5T_s)\right) \\
&+ 3.04\ln\left(S_a(1.5T_s)\right) - 0.244\left(\ln\left(S_a(1.5T_s)\right)\right)^2 + 1.50T_s + 0.278(M-7) \\
&\pm \varepsilon
\end{aligned}
$$

where D is the displacement in centimeters, k_y is the yield acceleration, M is the magnitude of the earthquake, T_s is the fundamental period of the structure, and ε is a normally distributed random variable with zero mean and standard deviation of 0.66. The fundamental period was calculated as $2.6H/V_s$ where H is the height of the embankment and V_s is the shear wave velocity of the embankment fill. A V_s of 1,100 ft/sec was assumed for the embankment based on an anticipated high degree of compaction. For the present evaluation, median (50th percentile) displacements are reported.

The results of the seismic deformation calculations are summarized in Table 4-2, with details included in Appendix E. Calculated seismic deformations for the two analysis sections were between 0.3 and 0.6 ft for both slopes of the maximum section and the upstream slope of the spillway section. The largest seismic deformation was calculated for the downstream slope at the spillway section and was 1.9 ft. For the 3:1 slopes at the site, the associated crest settlement would be approximately 0.6 ft. Given the design freeboard of 2 ft above the design WSE, these displacements are expected to be acceptable.

5. Project Feasibility and Recommendations

5.1 Detention Basin

Based on available information, preliminary site characterization, and analysis results, the construction of a floodwater detention basin at the Former Nursery site adjacent to Sir Francis Drake Boulevard is feasible. Explorations and analyses performed by GEI indicate the proposed berm will be able to withstand the design seismic event without major failure and proposed berm geometry meets slope stability design criteria.

Basin construction is expected to consist of a combination of excavation and fill placement. Estimations of excavation and fill needs to construct the downstream berm indicate there is sufficient borrow material on-site to construct the downstream detention berm. To be used in construction, the berm fill should meet the following guidelines:

1. Liquid Limit less than 45
2. Plasticity index between 8 and 30
3. 100% by weight passing the 3-inch sieve, and greater than/equal to 30% passing the No. 200 sieve
4. The material should be compacted to a relative compaction of 90% per ASTM D 1557 or higher with a water content between 1% dry-of-optimum and 2% wet-of-optimum.

If encountered, highly permeable or loose soils within the limits of embankment construction should be stripped and replaced with compacted fill meeting the guidelines above.

5.2 Floodwall/Gravity Wall

Based on available information from explorations, the construction of a gravity floodwall along Sir Francis Drake Boulevard is feasible. The exploration performed on the shoulder of Sir Francis Drake Boulevard suggest that the subsurface conditions are adequate for bearing capacity of a concrete gravity floodwall, and do not appear to contain materials susceptible to liquefaction triggering.

The concrete gravity floodwall would extend from the downstream edge of the access bridge to the Former Nursery site along Sir Francis Drake Boulevard to the crest of the proposed downstream berm with a length of approximately 400 ft. The top of the wall would remain constant at Elevation 238 ft. Based on the existing ground surface, the height of the wall would be up to 11 ft high in areas where the wall would extend the Fairfax Creek channel bottom, but on average 1 to 2 ft high.

5.3 Groundwater Control and Dewatering During Construction

If groundwater is encountered, dewatering will be necessary to perform temporary and permanent excavations. Based on groundwater level data collected from November 2016 through January 2017, the water table in the alluvial sediments can rise to elevations near the ground surface. No groundwater was encountered during investigations in early-August 2016, so it would also appear that groundwater levels fluctuate several feet annually likely in response to precipitation. If basin construction occurs during the summer months, dewatering may not be needed, except perhaps if performing deep excavations within Fairfax Creek. However, for the current conceptual configuration, groundwater infiltration into the basin during the winter months would be likely, since groundwater is observed to rise above the floor of the detention basin.

The recently completed investigation program terminated at a maximum depth of about 30 ft below ground surface, so the deeper stratigraphy within the alluvium is unknown. It is recommended that in-situ testing and additional deep investigations be performed at the site to evaluate the subsurface conditions related to groundwater.

5.4 Additional Explorations and Laboratory Testing

Additional explorations (borings and Cone Penetration Tests) and geophysical surveying are recommended at the site to further refine alternatives and develop detailed project designs. These explorations will improve the understanding of subsurface stratigraphy and laboratory testing will allow for the determination of strength and consolidation parameters to evaluate settlement and consolidation of the proposed earth structures.

Based on the interpretation of site conditions, it appears that the surficial granular soils (Zone 1) do not extend into the eastern portion of the site (based on SB-1) where the downstream berm would be constructed. Investigations (borings, cone penetration tests, or excavated test pits) are recommended within the footprint of the earthen dike to more accurately evaluate the foundation and assess liquefaction, seismically induced settlement, and consolidation potential. The effect of near-surface granular soils beneath the downstream berm may also have an impact on underseepage during periods of water storage. If encountered, these soils would either need to be removed or cutoff with a low permeability trench to prevent seepage from impacting nearby residences.

Although not encountered in the site investigations, it is likely that unconsolidated alluvial deposits are present in the Fairfax Creek channel. These deposits could range from clay to gravel, depending on the source material and depositional history. The conditions in Fairfax Creek within the embankment footprint should be further evaluated as part of detailed design.

We recommend excavated test pits be performed within the footprint of the basin for the purpose of borrow soil characterization. Samples should be collected from the test pits and submitted for environmental and geotechnical testing.

Based on the observed landslide history in the site vicinity, there is moderate risk of instability of the natural slope on the northern portion of the property, immediately adjacent to the proposed basin. Failure of this natural slope would not directly result in a loss of reservoir containment, but could impact basin capacity. A geotechnical investigation of the slope is recommended to evaluate the soil, rock, and groundwater conditions, and further assess impacts on the proposed basin configuration.

6. Limitations

This Geotechnical Report was prepared for the District for use in planning of the Former Nursery Detention Basin Project.

GEI prepared the conclusions, recommendations, and professional opinions of this report in accordance with the generally accepted geotechnical principles and practices at this time and location.

Soil and rock deposits can vary in type, strength, and other geotechnical properties between points of observations and explorations. The recommendations presented within this report are based on these projected explorations, and are subject to confirmation based on further exploration and testing at the site.

7. References

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Tables

Former Nursery Detention Basin Project
Fairfax, California
Table 4-1. Summary of Seepage, Stability, and Seismic Deformation Analysis Results

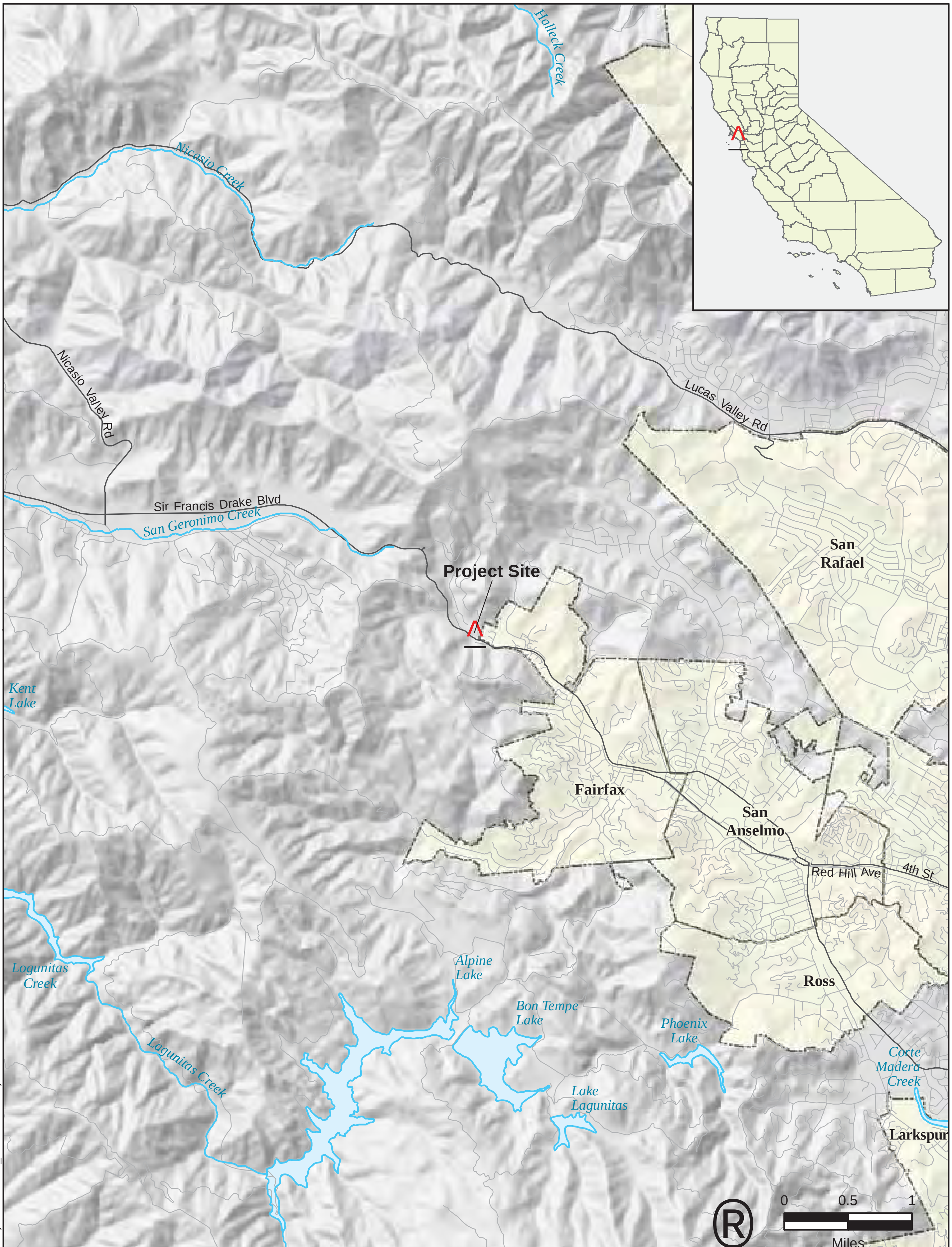
Analysis Section	Seepage		Stability					Seismic Deformation			
			Steady State Stability F.O.S.		Upstream Rapid Drawdown F.O.S.[1]	Post-Seismic Stability F.O.S.		Pseudo-Static k_y (g)		Deformation (ft)	
	Vertical Gradient at D/S Toe	Breakout Height above D/S Toe (ft)	D/S Slope	U/S Slope		D/S Slope	U/S Slope	D/S Slope	U/S Slope	D/S Slope	U/S Slope
Downstream Berm Maximum Section	0.14	2.0	1.79	2.81	2.13	1.79	2.81	0.24	0.31	0.6	0.3
Downstream Berm Spillway Section	0.28	4.9	1.50	3.05	2.15	1.50	3.05	0.16	0.31	1.9	0.5

Notes
F.O.S. = Factor of Safety
D/S = Downstream
U/S = Upstream
1. Rapid drawdown analyses were performed for drawdown from the maximum pool (EL. 236 ft, NAVD 88) to the bottom of the basin (EL. 224 ft, NAVD 88).

Former Nursery Detention Basin Project
Fairfax, California
Table 4-2. Liquefaction Susceptibility Screening for GEI Data

Material Zone	Exploration	Sample ID	Sample Depth (ft)	Sample Elevation (ft, NAVD 88)	Soil Classification	PI	% Fines	Clay-like Behavior
1	MW#2	S02A	2.5	232.1	SC	-	34	No
	MW#2	S04A	6	228.6	SM	NP	38	No
	MW#3	S03A	2.5	230.4	SC-SM	-	20	No
	MW#3	S04A	6	226.9	SC-SM	7	15	No
2	MW#1	S05A	7.5	226.4	CL	11	61	Yes
	MW#2	S07A	13.5	221.1	CL	12	-	Yes
	MW#3	S07A	13.5	219.4	CL	13	57	Yes
	SB#1	S02A	3.5	226.1	CL	10	-	Yes
	SB#1	S05A	11	218.6	CL	11	-	Yes
	SB#1	S06A	13.5	216.1	SC-SM	7	47	No
	SB#2	S06A	13.5	222.1	CL	9	-	Yes
3	MW#2	S10A	21	213.6	SC	-	17	No
	MW#3	S08A	16	216.9	GC	13	20	No
	SB#1	S10A	23.5	206.1	SC	9	17	No
	SB#1	S12A	28.5	201.1	SC	-	14	No
	SB#2	S12A	28.5	207.1	CL	26	-	Yes

Figures



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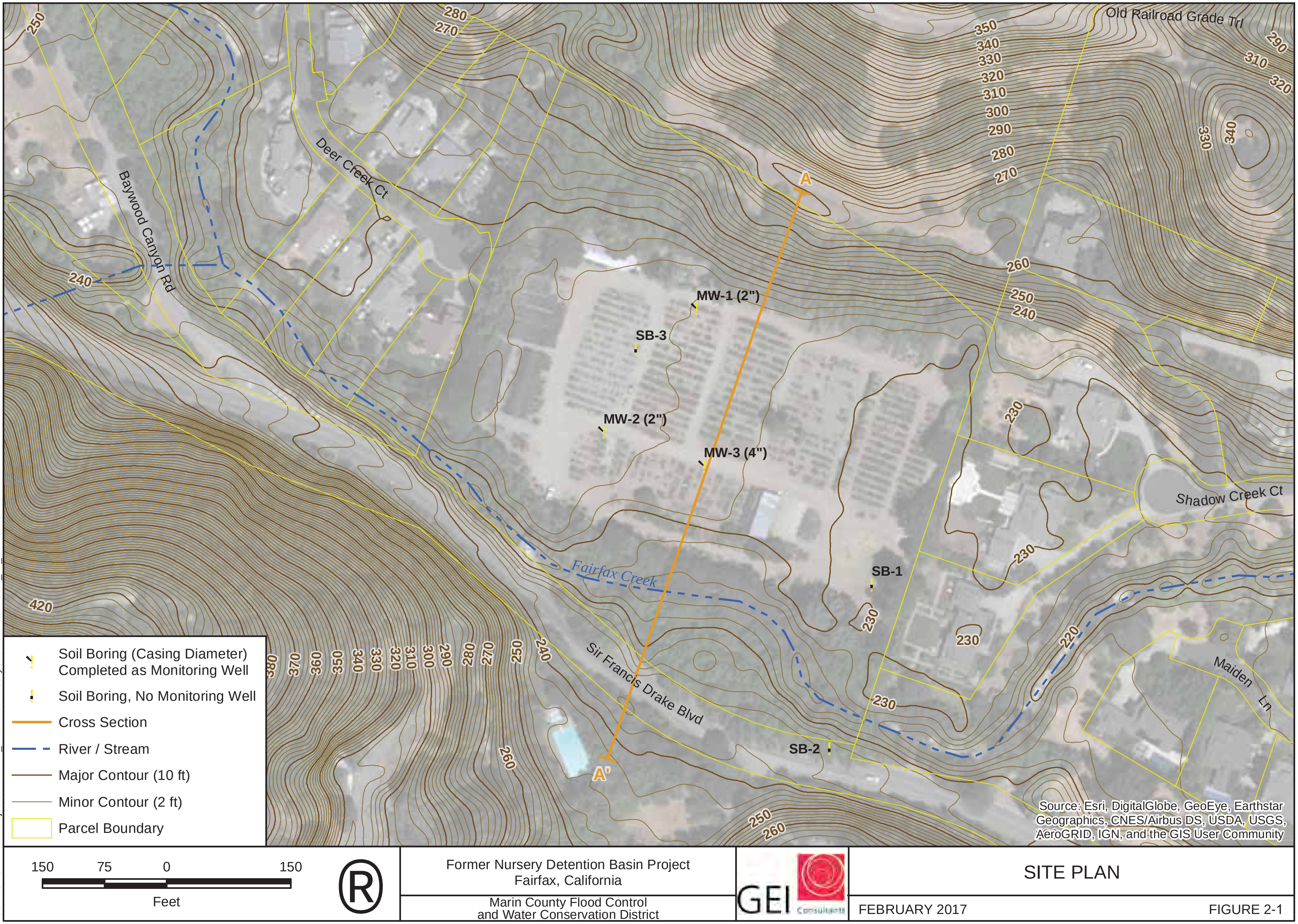
Former Nursery Detention Basin Fairfax, California	GEI Consultants	Site Vicinity
Marin County Flood Control and Water Conservation District		FEBRUARY 2017 — FIGURE 1-1



Former Nursery Detention Basin Project
Fairfax, California

Marin County Flood Control
and Water Conservation District

GEI Consultants

SITE PLAN

FEBRUARY 2017

FIGURE 2-1

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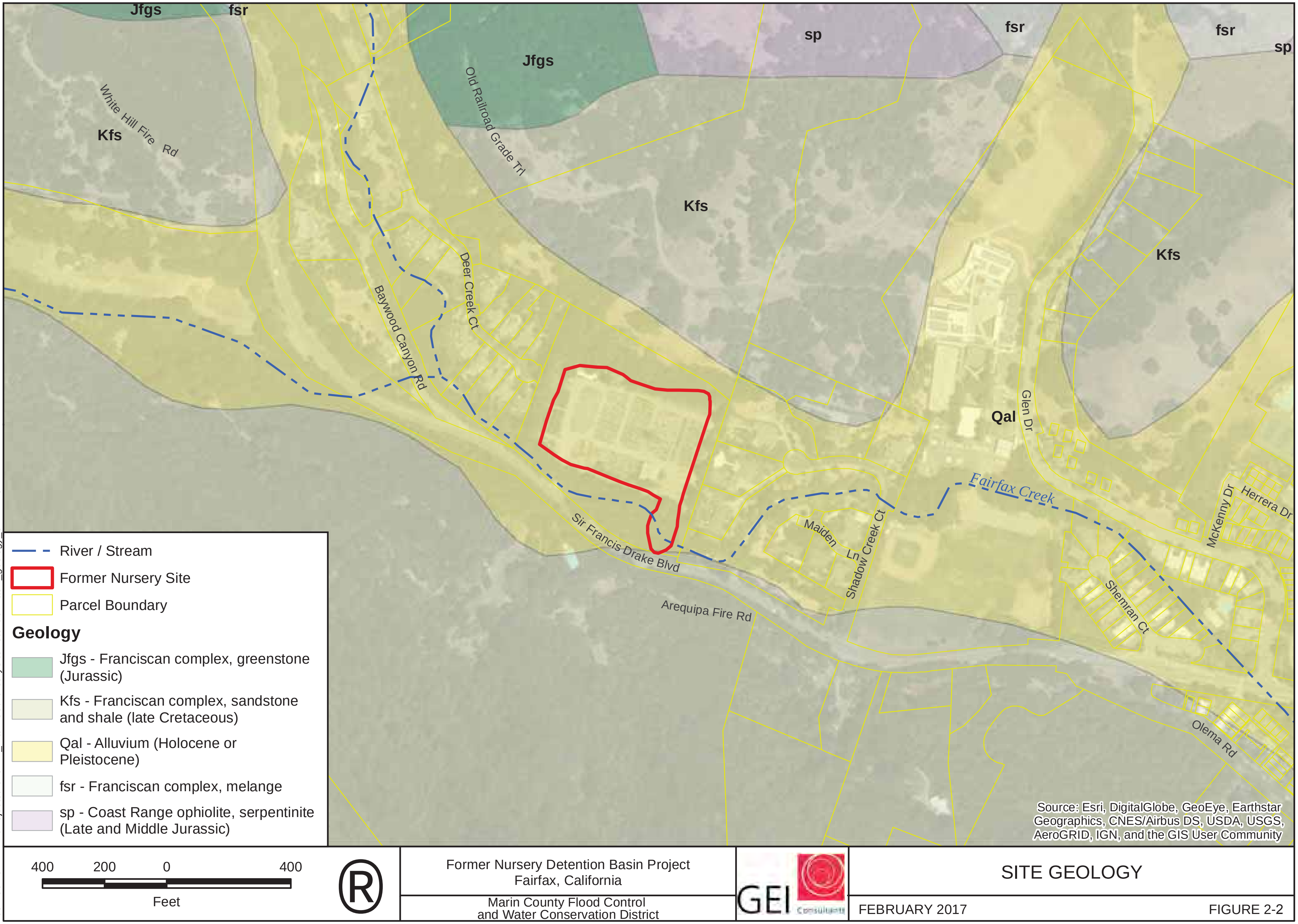


Former Nursery Detention Basin Project
Fairfax, California

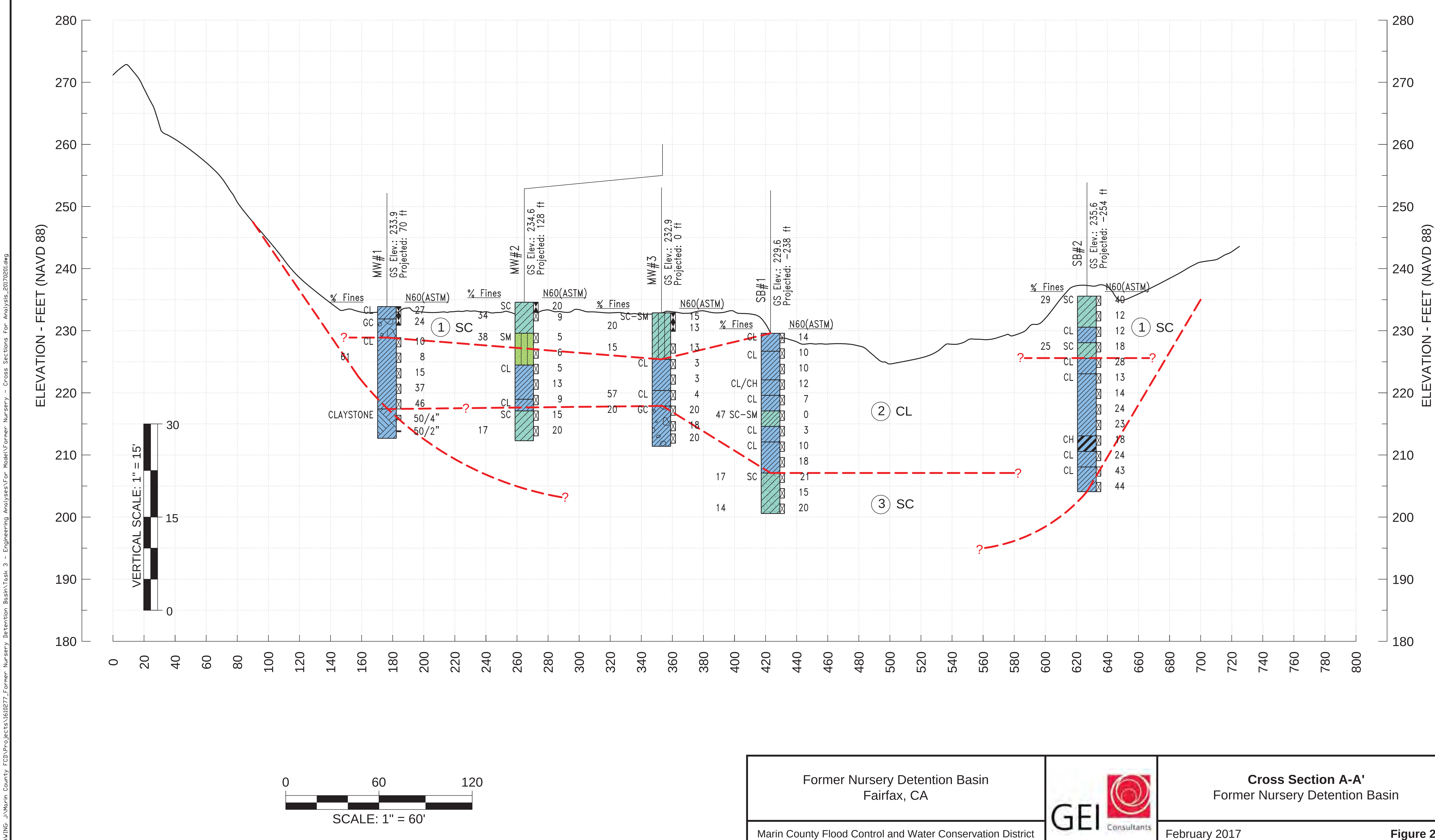
Marin County Flood Control and Water Conservation District

GEI Consultants

SITE GEOLOGY

FEBRUARY 2017

FIGURE 2-2



Former Nursery Detention Basin
Fairfax, CA

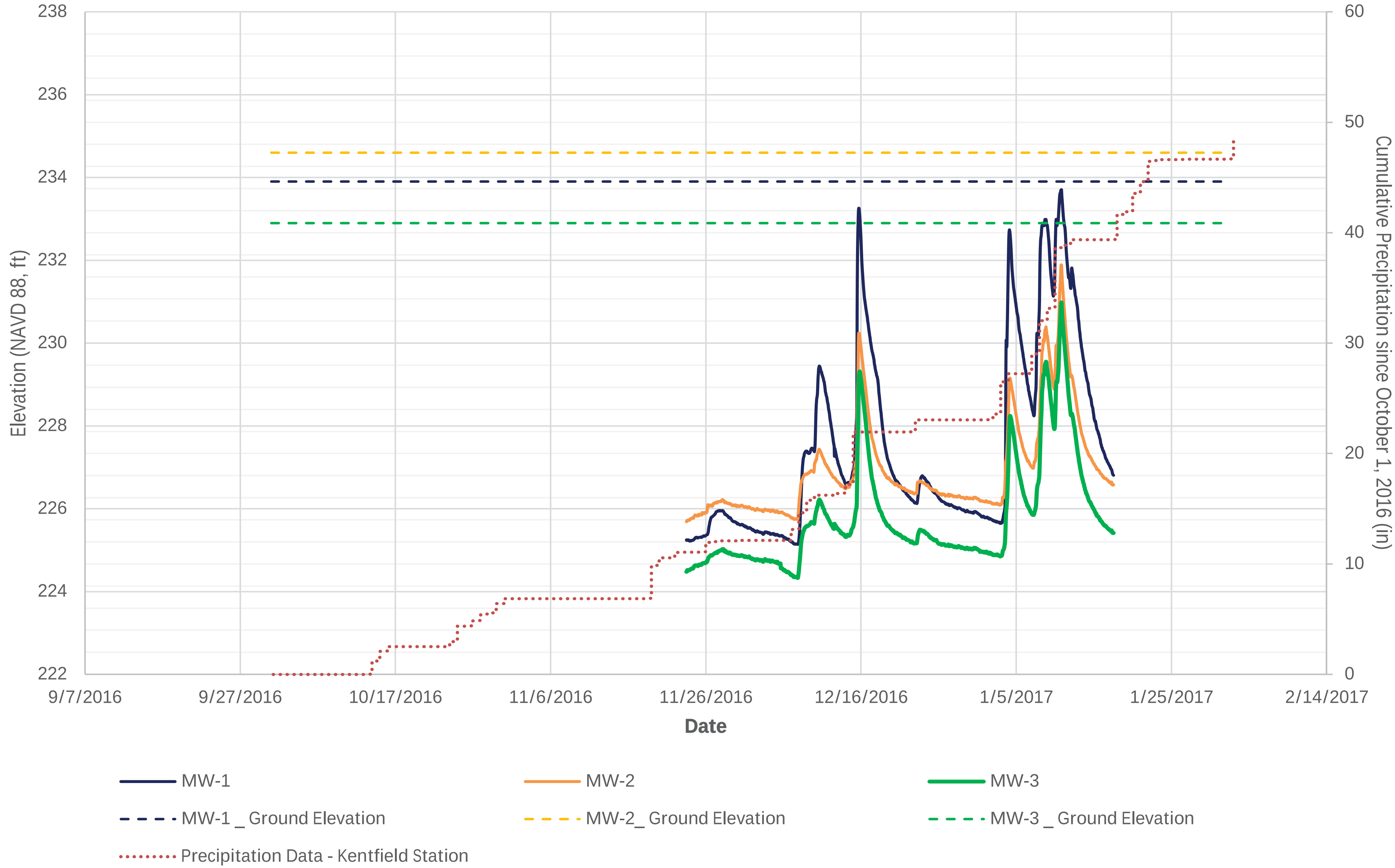
Marin County Flood Control and Water Conservation District

GEI Consultants

Cross Section A-A'
Former Nursery Detention Basin

February 2017

Figure 2-3



Former Nursery Detention Basin Marin County, California	GEI Consultants	Nursery Site Groundwater Levels and Precipitation	
Marin County Flood Control and Water Conservation District San Rafael, California	Project 1610277	February 2017	Figure 2-4

SYMBOLS

Contact between adjacent geologic units. Mostly approximately located except in rare well-exposed locations. Also contacts between all units within Franciscan melange, most all of which are faulted.

Fault, shown solid where fault traces are located with confidence, dashed where approximately located in bedrock areas, and dotted where assumed to be located but buried beneath Quaternary deposits. Queried where considerable doubt exists as to the location of the concealed trace. No evidence of recent faulting was found for any of the faults on this map, therefore all of the faults shown are presumed to be inactive.

Landslide deposits and debris avalanche scars that are too small to be delineated at this scale.

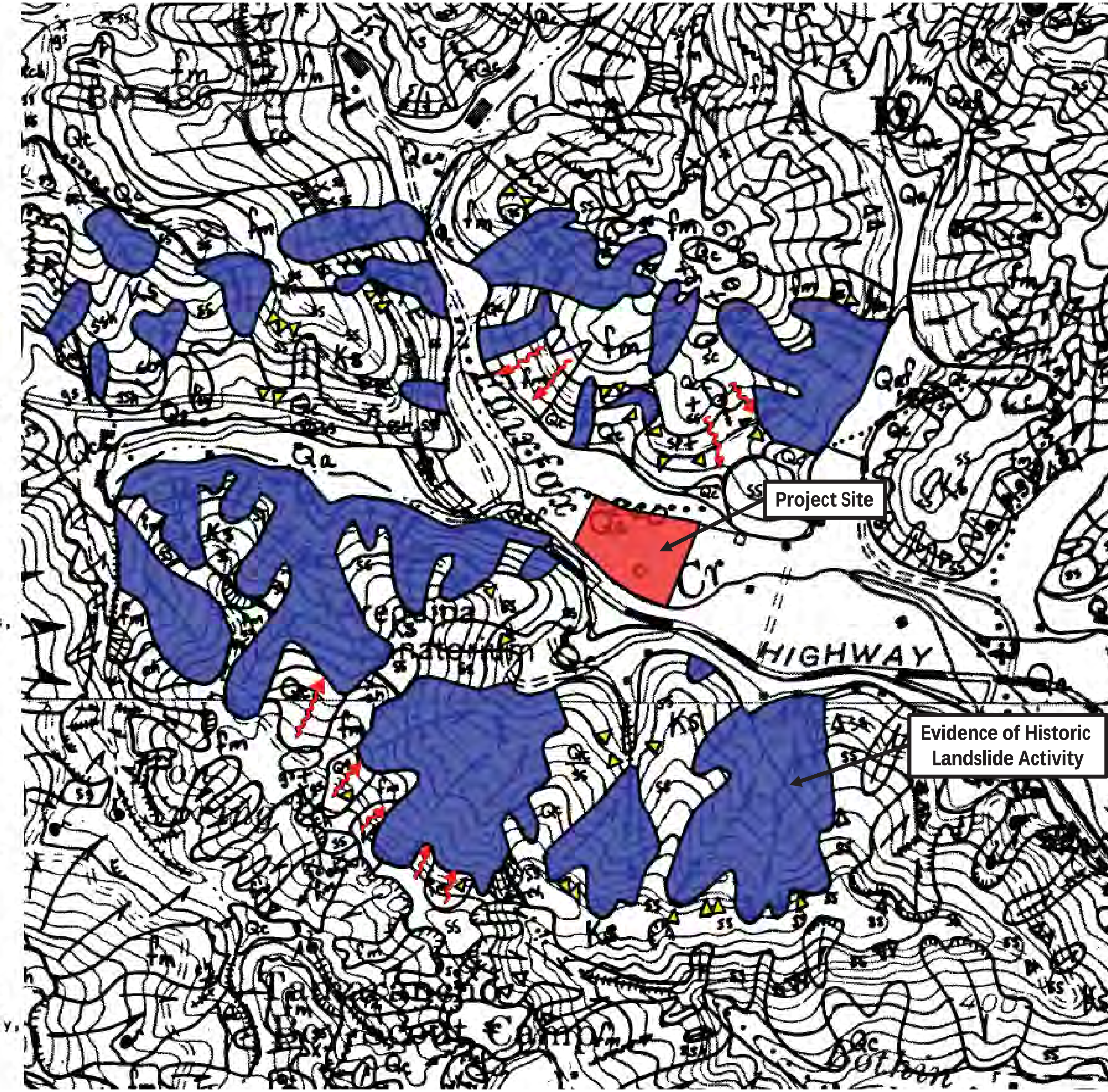
Slopes exhibiting evidence of continuous or intermittent downslope creep of surface zone. Boundaries of such zones commonly are obscure; however, attempts were made, where possible, to delineate the boundaries of the affected areas. Found principally within debris flow landslide deposits and within areas underlain by Franciscan melange. Evidence includes wrinkled topographic surfaces, leaning structures and trees that normally would be straight, tension cracks in soils, and cracked, sagged, or otherwise disrupted pavements and retaining walls.

Headwall scarps of block slump and debris flow landslides, and scars left at sources of soil and rock debris avalanches.

Gully; maximum depth given in feet.

DEBRIS FLOW LANDSLIDES. Predominantly deposits of unconsolidated and unsorted soil and rock debris (colluvium) that have moved downslope en masse or in increments by flow or creep processes. Slip surfaces in the base materials of these landslides are roughly planar and approximately parallel to the slope surface. Includes some soil and rock debris avalanche deposits that have accumulated outward from the base of slopes by rapid flow. Estimated maximum thickness in feet is indicated where such estimates could be made with reasonable confidence from surface observations.

BLOCK SLUMP LANDSLIDES. Masses of relatively intact to highly disrupted bedrock that have moved downslope by rotational slip along deep concave slip planes, or rarely, by translational slip along planar surfaces. Commonly flanked by, and succeeded downslope by, debris flow deposits.



Former Nursery Detention Basin Marin County, California	GEI Consultants	Site Landslide History
Marin County Flood Control and Water Conservation District San Rafael, California	Project 1610277	February 2017 Figure 2-5

Former Nursery Detention Basin Project

Field Investigation Report

Fairfax, California

Submitted to:
Marin County Flood Control and Water Conservation District
3501 Civic Center Drive, Room 304
P.O. Box 4186
San Rafael, CA 94913

Submitted by:
GEI Consultants, Inc.
2868 Prospect Park Drive, Suite 400
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96-631-4500

February 2017
Project 1610277

Graham Bradner, P.G., C.E.G. C.HG.
Senior Engineering Geologist

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1. Introduction

1.1 Program Overview

GEI Consultants Inc. (GEI) is assisting the Marin County Flood Control and Water Conservation District (District) in a preliminary geotechnical evaluation of the Former Nursery Detention Basin Project (Project) site located in Fairfax, CA (Figure 1). The overall goal of the Project is to provide temporary storage of floodwaters for peak flow attenuation on Fairfax Creek. The investigation described herein provides site-specific information on the soil and groundwater conditions at the site to support preliminary geotechnical evaluations of project alternatives.

1.2 Purpose and Scope

The preliminary plan for the detention basin includes excavation of the site to lower the ground elevation by about 6 to 12 feet (to Elevation 224 ft NAVD88), and construction of an earthen dike on the downstream (eastern) boundary. Natural ground on the western side of the basin, and high ground on the northern and southern sides of the basin complete the perimeter impoundment. An earthen or concrete dam and outlet structure would be constructed in Fairfax Creek to regulate and control stream flows.

GEI has undertaken geotechnical explorations within the former nursery as part of a comprehensive assessment of the current conditions at the project site. The purpose of the explorations was to obtain information on environmental and geotechnical subsurface conditions and refine soil properties for engineering analyses.

This Field Investigation Report (FIR) summarizes data collection, subsurface investigations, and laboratory testing performed as part of this project. This report includes boring logs, laboratory test results, piezometer as-builts, transducer installation records, and a site plan showing exploration locations.

The scope of this geotechnical exploration program included:

- Background review of existing data;
- Completion of the geotechnical explorations utilizing auger boring methods;
- Construction of monitoring wells;
- Documentation of exploration locations and elevations;

- Preparation of boring logs and monitoring well construction as-builts;
- Environmental and geotechnical laboratory testing; and
- Installation of water level monitoring transducers in the monitoring wells.

A Geotechnical Report will be prepared by GEI as a companion to this FIR, which will evaluate the results of the environmental testing and will include seepage and stability analysis. It should be noted that future additional design-level explorations and analyses may be required to assist in the final design phase and the development of construction plans and specifications for the project components.

2. Site Conditions

2.1 Site Description

The Former Nursery Detention Basin site is a seven acre parcel previously used as a growing grounds for a retail landscaping nursery. Existing structures at the site include a 942 square foot (SF) sales office, 10,400 SF of shade structures, an 800 SF residence, 1,748 SF art gallery/studio, a well and water tank, a MMWD water service, and a septic tank system. Fairfax Creek flows from west to east in a natural channel in the southern portion of the parcel. The center portion of the parcel is relatively flat and the northern portion of the parcel is a steep hillside. The site is accessed across a bridge over Fairfax Creek from Sir Francis Drake Blvd.

2.2 Subsurface Conditions

Subsurface conditions within the Project extents are discussed below based on review of historic geologic mapping, site reconnaissance, and recent GEI explorations. Data collection details and methods are further discussed in Section 3 of this FIR.
The site is situated in the Coast Range province, along an east-west trending valley flanked to the north and south by relatively steep hillsides. The hills are Franciscan Complex, and appear to consist of mélange on the north side of the site, and variably deformed Cretaceous sandstone and shale on the south side of the site, south of Sir Francis Drake Blvd (Blake, 2000). The valley floor is filled with Quaternary alluvial and colluvial sediments of uncertain depths, which underlie the project site. Based on the slope of the adjacent hillsides, the sediment accumulations could be as thick as 100 to 150 feet in the deepest section of the valley. The alluvial sediments thin and pinch out or merge with Quaternary hillside slope deposits at the edges of the valley.

The subsurface conditions within the site consist of interbedded layers of gravel, sand, silt, and clay sediments extending beyond the depths explored in the central portion of the site, but overlying weathered bedrock near the flanks of the valley. The upper soil is commonly sand and gravel material to depths of about 5 feet, which is underlain by clayey soils. The thickness of the clay layer varies from approximately 15 feet in the middle of the site to 22.5 feet on the east side of the site. Sandy, gravelly sediments underlie the clay layer in some portions of the site. Groundwater was not encountered during this field investigation program, which was performed in early-August 2016.

3. Field Exploration

3.1 General

The field exploration program summarized in this report was performed as described in the *Subsurface Exploration Work Plan, Former Nursery Detention Basin* (Work Plan), dated August 2016 (GEI, 2016). The work plan was reviewed and approved by the District. Table 1 summarizes the subsurface explorations performed as part of this investigation. Figure 2 shows an aerial image of the former nursery, investigation locations, and other site features. Borings logs, monitoring well as-builts, laboratory test results, and transducer installation documentation are provided as Appendices A through D, respectively.

Prior to the beginning field investigations, the goals and challenges of the exploration program were identified through discussion and site reconnaissance with District staff and exploration subcontractors. Other significant considerations of the exploration program included:

- Project goals and objectives;
- Project Health and Safety Plan;
- The scope of field investigations;
- Sampling procedures and sample requirements;
- Exploration depth targets;
- Site access and contact information;
- Utility clearance and permits;
- Site security and noise;
- Backfill requirements;
- Disposal of cuttings; and
- Applicable standards.

3.2 Health and Safety

A project-specific Health and Safety Plan (HASP) was developed for the field investigation. Field personnel were given a health and safety briefing by the Project Manager, and attended health and safety tailgate meetings. Field personnel were also provided with specific guidelines and information about emergency action protocols, including the location of the closest emergency medical facility. Field personnel had no reportable incidents during field investigations.

3.3 County Drilling Permits

A Marin County "test hole/soil boring" permit was issued by the Environmental Health Services Department. The permit is applicable for one year, beginning on July 22, 2016. The permit requires that field operations follow all Marin County rules, regulations, Codes, laws and statutes as per County well drilling procedures. Copies of the applicable permits were provided in the Work Plan, and are also available upon request.

3.4 Utility Clearance

The locations were visually observed for the presence of overhead and underground utilities and then outlined in white paint as required by Underground Service Alert (USA). USA was then contacted a minimum of 48 hours before subsurface investigation of the site. A USA ticket number as well as the clearance date, expiration date and extension date were obtained for the work area and documented in the project file.

Prior to performing exploration activities at each location, the presence of underground utilities was also evaluated by Subtronic Corporation of Concord, CA, a private utility locator. In general, no major utility conflicts were encountered and each exploration could be performed at, or very close to, the planned location.

3.5 Field Program Description

The exploration program consisted of six borings, with monitoring wells constructed within three borings. Exploration locations and depths are summarized in Table 1, and are shown in Figure 2.

3.5.1 Exploration Methods

Vertical borings were drilled by Gregg Drilling and Testing, Inc. (Gregg) on August 3 and 4, 2016 using a truck-mounted drill rig with hollow-stem augers. GEI personnel coordinated the drilling program, logged the borings, collected and transported the soil samples, and observed the monitoring well installations.

Sampling of the subsurface material was performed using SPT (Standard Penetration Test) samplers, for both environmental and geotechnical samples, and Modified California (MC) barrel samplers in accordance with the procedures described in ASTM D 1586-11. Environmental samples were collected within three feet of the ground surface at explorations within the operational area of the former nursery using SPT and MC samplers with stainless steel liners. After environmental samples were collected, SPT geotechnical samples were driven at 2.5-foot intervals to the bottom depth of each exploration for soil classification and index testing.

Both the environmental and geotechnical SPT samplers had a 2-inch outside diameter with a 1.375-inch inside diameter shoe, but the environmental SPT sampler had a 1.5-inch inside diameter for use with 6-inch long stainless steel liners. The SPT geotechnical sampler had an inner diameter of 1.375-inches without liners. The MC sampler has a 2.5-inch outside diameter and 2-inch inside diameter with a 1.875-inch inside diameter shoe; this sampler was advanced with 6-inch long stainless steel liners.

Drive samples were attached to either AWJ or NWJ rod, and were driven using a 140-pound automatic trip hammer with a free fall of 30 inches. Due to mechanical issues that occurred with Gregg's drill rig during the project, a second rig was used to complete the geotechnical investigations. The drill rigs and associated hammer efficiencies are as follows:

- Rig D-26 (Mobile B-53) = 76% per testing on October 29, 2014; used for MW#1 and MW#3.
- Rig D-12 (Mobile B-61) = 69% per testing on March 2, 2016; used for MW#2, SB#1, SB#2, and SB#3.

The densities of coarse-grained soils were described in the field using the number of measured blow counts to drive an SPT sampler. Consistencies of fine-grained soils were based on pocket penetrometer measures, and evaluated qualitatively from measured blow counts.

3.5.2 Boring Logs

A field boring log was completed by the field logger for each boring drilled. Logs are included in Appendix A. The procedures for logging are described in detail in the Work Plan. Subsurface conditions observed in soil samples and drill cuttings or perceived through the performance of the drill rig (for example, ease/difficulty of drilling, rig chatter in gravel) were described in the "Remarks" column on the log. Besides descriptions of individual soil samples, boring logs indicate the tops and bottoms of soil layers. Descriptions were included for each soil layer, with horizontal lines drawn to separate subjacent layers.

3.5.3 Monitoring Wells

Three of the geotechnical borings were converted to open standpipe monitoring wells. Well locations are summarized on Table 1 and as-built details are included in Appendix B.

MW-1 and MW-2 were installed in 8-inch diameter borings with 2-inch diameter Schedule 40 polyvinyl chloride (PVC) blank casing and screen. MW-3 was installed in a 10-inch diameter boring with 4-inch diameter PVC blank casing and screen. The piezometers included a 15 to 16-foot well screen consisting of mill-slot (0.020 inch) PVC screen. Piezometer screens were surrounded by a 2 x 12 sand pack, extending from just below the transition seal to the bottom of the borehole. The sand was tremied in place through the hollow-stem augers, with a measuring tape in the hole to ensure bridging was not occurring, and tamped once in the hole. A 1-foot thick bentonite transition seal was placed above the sand pack, to prevent grout from infiltrating the sand pack. Bentonite chips were hydrated for at least 30 minutes prior to installation of the transition seal. Neat cement grout containing five percent powdered bentonite was installed above the transition seal, extending to within about one foot of the ground surface. Groundwater was not present at the time of installation, so the wells were not developed. However, because the wells were installed using hollow stem auger methods with no introduction of bentonite or other drilling fluids, the well screens are expected to be clean and free of significant sediment accumulation. A flush-mounted well vault was installed at the ground surface with sufficient rise to shed water and prevent ponding. The piezometers are protected with locking vault covers.

3.5.4 Exploration Completion and Site Restoration

For those soils borings not converted to monitoring wells, the drilling contractor sealed the borehole with a neat cement grout in accordance with Marin County Environmental Health standards and State Department of Water Resources Bulletin 74-81 and 74-90. All grout was mixed in batches using 55-gallon drums. The grout was placed in the boreholes through the augers, with the augers extending to the bottom of the boreholes. Grout levels were monitored during equipment tear-down at the work sites and any loss of grout was noted and grout was replaced.

Drill sites were cleaned and restored as closely as practicable to pre-drilling conditions. At the completion of drilling, all equipment and materials, tools and unused materials were removed and trash was disposed offsite.

3.6 Description and Classification of Soils

Soils were described in general accordance with ASTM D2487 and D2488 procedures and as outlined in the Work Plan. Soil descriptions are presented on the boring logs included in Appendix A.

3.7 Documentation of Exploration Locations

Field personnel used a handheld GPS unit to record boring and monitoring well locations in the field. GPS coordinates and spatial references in the field were used to position the exploration locations in a geographic information system (GIS). Topographic data for the site provided by the District was then used to estimate the ground surface elevations at these locations. The District provided LiDAR data was mostly assembled from surveys flown in April/May 2010 by the Golden Gate LiDAR project; the complete file for the County was initially assembled in 2011 and revised in 2013 (Version 6, dated December 18, 2013). Coordinates are provided in Table 1 and on the exploration logs in Appendix A. The locations are reported in feet using NAD83 California State Plane Zone II for the horizontal locations and NAVD88 for the elevations.

4. Laboratory Testing

4.1 Soil Testing

Laboratory tests were performed on selected soil samples from boreholes to obtain information about the environmental and geotechnical characteristics of subsurface soil. The laboratory testing program was developed based on the purpose of the project and review of information generated during subsurface investigations.

Environmental and geotechnical laboratory testing was performed by Curtis & Tompkins in Berkeley, California and Cooper Testing Laboratory in Palo Alto, California, respectively. Environmental testing results were used to assess the presence and distribution of naturally – occurring and manmade constituents in soils at the site. Geotechnical testing results were used to refine soils descriptions and material classifications. Laboratory test results are discussed below and summarized in Tables 2 and 3. The laboratory testing reports are provided in Appendix C. Geotechnical test results are also included on the boring logs in Appendix A.

4.1.1 Environmental Testing

Environmental laboratory testing of soil samples included the following tests.

- Total Organic Carbon, SM 5310C
- Metals, EPA 6010B
- Volatile Organic Compounds, EPA 8260
- Semivolatile Organic Compounds, EPA 8270
- Polychlorinated Biphenyls, EPA 8082
- Organochlorine Pesticides, EPA 8081A

According to the results of laboratory testing, there were some low detections of VOCs, SVOCs, and organochlorine pesticide constituents at the site, but none exceeded the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) Environmental Screening Levels (ESLs), rev. 3, February 2016. Metals concentrations were generally consistent across the site, with slightly elevated levels of arsenic, chromium, and nickel above the ESLs. However, these metals are common to the region and typical of background values.

As discussed in Section 10.2 of the *ESL User's Guide*, arsenic concentrations in site soils typically exceed risk-based screening levels by one or more orders of magnitude. In many situations, this is due to naturally occurring background concentrations. Duvergé (2011) conducted a study of regional background concentrations of arsenic in undifferentiated urbanized flatland soils and proposed an upper estimate for background arsenic (99th percentile) of 11 mg/kg in the San Francisco Bay Area. This value can be used, as appropriate, in consultation with the overseeing regulatory agency.

Similar to Arsenic, other metals such as chromium and nickel can also be present in regional soils at background levels exceeding the ESLs. SFRWQCB's *Draft Technical Reference Document, Characterization and Reuse of Soil from Multiple Sources for Maintenance of Levees Adjacent to Aquatic Environment*, dated August 1, 2006, provides recommendations for reuse of local soil for levee projects. Including in the recommendations are screening thresholds for various analytes which are generally based on ambient values statistically derived from locally-collected data. The recommend ambient concentrations for arsenic, chromium, and nickel are higher than those listed in the ESLs (Arsenic = 15.3 mg/kg, Chromium = 112 mg/kg, Nickel = 112 mg/kg), and are consistent with concentrations encountered at the site.

4.1.2 Geotechnical Testing

Geotechnical laboratory testing of soil samples included the following index tests.

- Sieve analysis, ASTM D 422
- Atterberg Limits, ASTM D 4318

Index testing of soil samples collected from the Former Nursery site indicate fines content (i.e. silt and clay content) ranges from 14% to 61%, but field classification of samples in some areas indicate soils with higher fines content may also be present. Gravel content ranged from 0% to 48.6% and sand content ranged from 31% to 63%. The maximum particle size of gravel was approximately 1-inch. Plasticity indices ranged from 7 to 26 and liquid limits ranged from 23 to 47, indicating a mixture of silty and clayey fines.

An evaluation of site soils for reuse as borrow will be presented in the forthcoming Geotechnical Report.

5. Quality Assurance and Quality Control

Quality Assurance/Quality Control (QA/QC) was performed on all work products (deliverables) at the project and task level. QA/QC procedures were performed under the direction of the Project Manager. QA/QC was also performed on all subcontractor deliverables.

5.1 Hammer Energy Measurement

To ensure the consistency of data collected from SPTs, which are critical to liquefaction evaluation, the drilling subcontractor performed SPT energy measurements on SPT hammers to evaluate the energy that each hammer delivered. Hammer calibrations for the two drilling rigs equipped with automatic trip hammers utilized for this project were conducted in accordance with ASTM D 4633. The drill rigs and associated hammer efficiencies are as follows:

- Rig D-26 (Mobile B-53) = 76% per testing on October 29, 2014; used for MW#1 and MW#3.
- Rig D-12 (Mobile B-61) = 69% per testing on March 2, 2016; used for MW#2, SB#1, SB#2, and SB#3.

5.2 Boring Logs

Borings were logged in the field by engineers in general accordance with ASTM and California State guidelines. Boring logs for this project were created by carrying out the following QC steps:

- Entering field sampling details and soil descriptions on boring logs.
- The Project Manager and other geotechnical staff performing QC checks on field logs.
- Preparing draft gINT (Version 8) logs based on checked field logs.
- Engineering staff reviewing laboratory test results to gauge conformance with field boring logs.
- Refining boring log soil classifications and descriptions where appropriate based on laboratory test results.
- Geotechnical staff reviewing updated gINT boring logs

All gINT work was carried out by the project team's staff engineers and geologists. The gINT logs were taken through various levels of checks by the field loggers, the project team's engineers/geologists responsible for the gINT input, and the Project Manager.

5.3 Laboratory Testing and Test Results

While the laboratory testing was in progress, results were reviewed as they became available, maintained regular coordination with the laboratory representatives, addressed questions posed by laboratory representatives and provided additional instructions as necessary.

Laboratory index test results were reviewed by project team to gauge conformance with field boring logs. If laboratory results were in conflict with the field boring log information, the matter was typically resolved through a visual check and classification of a sample of the soil in question by the Project Manager and Field Logger.

5.4 Report

QA was performed on all deliverables and consisted of independent technical review (ITR), audits, documentation, and reporting. QC was also performed on all deliverables and included tasks, such as detail checking, computer program documentation, and nonconformance and corrective action documentation. QC was performed under the direction of the Project Manager.

6. Limitations

This geotechnical report, associated data collection and preparation have been performed in accordance with the standard of care commonly used as the state-of-practice in the engineering profession. Standard of care is defined as the ordinary diligence exercised by fellow practitioners in this area performing the same services under similar circumstances during the same period.

Discussions of subsurface conditions summarized in this report are based on subsurface soil and groundwater conditions at limited exploration locations. Variations in subsurface conditions may exist between exploration locations, and the project team may not be able identify all adverse conditions in the levee and/or its foundation.

No warranty, either expressed or implied, is made in the furnishing of this report. The project team makes no warranty that actual encountered site and subsurface conditions will exactly conform to the conditions described herein, nor that this report's interpretations and recommendations will be sufficient for all construction planning aspects of the work. The design engineer and/or contractor should perform a sufficient number of independent explorations and tests as they believe necessary to verify subsurface conditions rather than relying solely on the information presented in this report.

Data presented in this report are time-sensitive in that they apply only to locations and conditions existing at the time of the exploration and preparation of this report. Data should not be applied to any other projects in or near the area of this study nor should they be applied at a future time without appropriate verification.

This report is for the use and benefit of Marin County Flood Control and Water Conservation District. Use by any other party is at their own discretion and risk.

This report is one of multiple documents describing work completed. It will be supplemented with other reports presenting evaluations of this information.

7. References

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SFBRWQCB, 2016. *User's Guide: Derivation and Application of Environmental Screening Levels (ESLs).* San Francisco Bay Regional Water Quality Control Board. Interim Final 2016. February 2016.

State of California, Department of Water Resources, Division of Flood Management. 2006. *Soil and Rock Logging, Classification, Description, and Presentation Manual*. December 6, and revised February 2008 (September 2009).

Tables

Table 1 - Subsurface Exploration Summary
Former Nursery Detention Basin Project, Marin County Flood Control and Water Conservation District

Boring ID	Description	Date Started	Date Completed	Latitude	Longitude	Existing Ground Elev. (feet)[1]	Boring Depth (feet)	Screen Interval Length (feet)
MW#1	8" auger boring with 2" well	8/3/2016	8/3/2016	38.002706	-122.610379	233.9	21.2	15
MW#2	8" auger boring with 2" well	8/4/2016	8/4/2016	38.002290	-122.610757	234.6	22.3	16
MW#3	8" auger boring reamed to 10" and 4" well	8/3/2016	8/4/2016	38.002185	-122.610332	232.9	21.5	15
SB#1	6" auger boring	8/4/2016	8/4/2016	38.001803	-122.609618	229.6	29	--
SB#2	6" auger boring	8/4/2016	8/4/2016	38.001257	-122.60978	235.6	31.5	--
SB#3	2" to 2.5" driven samplers	8/4/2016	8/4/2016	38.002569	-122.61063	234.9	3	--

Notes:

[1]Existing Ground Elevations (ft) obtained from MCFCWD LiDAR assembled in 2011 and revised in 2013 (6th edition, dated 12/18/2013)

Table 2. Summary of Analytical Soil Testing Results, Former Nursery Detention Basin

Marin County Flood Control and Water Conservation District

Analyte	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels [1]		Test Result [2]			
	Direct Exposure Human Health Risk Level - Res: Shallow Soil Exposure	Tier 1 ESL [3]	MW #1	MW #2	MW #3	SB #3
Volitile Organic Compounds (µg/kg)						
Toluene	970,000	2,900	0.9	ND	ND	ND
Semivolitile Organic Compounds (µg/kg)						
2-Methylnaphthalene	240,000	250	ND	ND	ND	12
Phenanthrene	--	11,000	13	11	14	28
bis(2-Ethylhexyl)phthalate	39,000	39,000	67	11	39	68
Organochlorine Pesticides (µg/kg)						
Heptachlor epoxide	67	0.42	7.3	ND	ND	ND
4,4'-DDE	1,900	1,900	58	ND	ND	ND
4,4'-DDD	2,700	2,700	6	ND	ND	ND
4,4'-DDT	1,900	1,900	110	ND	ND	ND
alpha-Chlordane	480 [4]	480 [4]	33	ND	ND	ND
gamma-Chlordane			33	ND	ND	ND
Metals (mg/kg)						
Antimony	31	31	0.21	0.23	0.20	0.13
Arsenic	0.07	0.07	8.1	7.8	7.6	5.8
Barium	15,000	3,000	210	200	440	170
Beryllium	150	42	0.55	0.55	0.59	0.55
Cadmium	39	39	0.130	0.090	0.057	0.080
Chromium	0.3 [5]	0.3 [5]	100	110	95	68
Cobalt	23	23	20	19	22	17
Copper	3,100	3,100	39	28	39	29
Lead	80	80	15	9.5	11	10
Mercury	13	13	ND	0.17	0.25	0.66
Molybdenum	390	390	0.35	0.21	0.79	0.44
Nickel	820	86	140	120	130	89
Selenium	390	390	0.20	0.19	0.19	0.14
Silver	390	390	0.050	0.050	0.040	0.063
Thallium	1	1	0.066	0.055	0.070	0.057
Vanadium	390	390	54	54	59	44
Zinc	23,000	23,000	85	72	80	62
Total Organic Carbon (%)						
Total Organic Carbon	--	--	1.00	0.86	0.42	0.43

(1) *Environmental Screening Levels, San Francisco Bay Regional Water Quality Contol Board,* February 2016 (Rev. 3)

(2) ND = Not Detected

(3) Tier 1 ESLs are used for protecting sites with unrestricted land and water use, shallow soil contamination, shallow groundwater, and permeable soil per *ESL Users Guide, SFRWQCB, February 22, 2016*

(4) sum Chlordane concentration

(5) ESL for Chromium VI

Table 3 - Summary of Geotechnical Soil Testing Results
Former Nursery Detention Basin Project, Marin County Flood Control and Water Conservation District

Boring ID	Depth (ft)	Sample No.	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	% Gravel	% Sand	% Fines
MW#1	1.5	Composite[1]				9.5	7.5	36.9	55.6
	7.5	S05A	30	19	11	19	7.5	31.2	61.3
MW#2	1.5	Composite[2]				19	18.4	47.4	34.2
	5.0	S04A	24	0	24	4.75	0	61.7	38.3
	12.5	S07A	32	20	12				
	20.0	S10A				25	34.7	48.3	17
MW#3	1.5	Composite[3]				25	29.3	51	19.7
	5.0	S04A	23	16	7	25	42.1	42.9	15
	12.5	S07A	32	19	13	9.5	0.4	42.4	57.2
	15.0	S08A	31	18	13	25	48.6	31.8	19.6
SB#1	5.0	S03A	29	19	10				
	10.0	S05A	31	20	11				
	12.5	S06A	25	18	7	2	0	53.3	46.7
	22.5	S10A	27	18	9	25	34.2	49.2	16.6
	27.5	S12A				25	36.2	49.8	14
SB#2	0.0	S01A	26	18	8	19	19.5	51.1	29.4
	7.5	S04A				19	12.6	62.7	24.7
	12.5	S06A	27	18	9				
	27.5	S12A	47	21	26				
SB#3	1.5	Composite[4]				19	27.5	39.6	32.9

Notes:

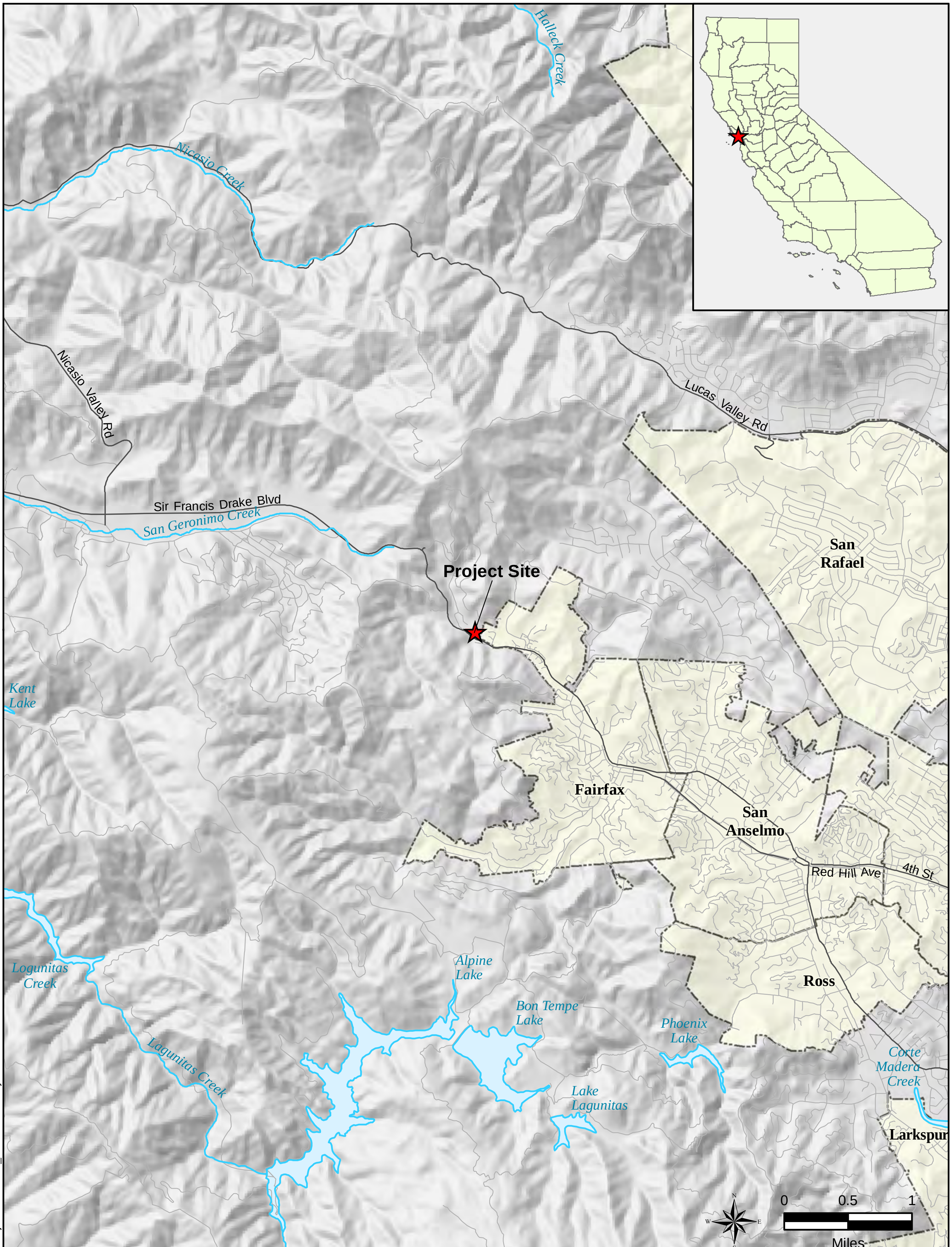
[1]Lab testing on combined sample (S01B, S01A, S02B, S02A, S03B, and S03A)

[2]Lab testing on combined sample (S01B, S01A, S02B, S02A, S03B, and S03A)

[3]Lab testing on combined sample (S01B, S01A, S02A, S03C, S03B, and S03A)

[4]Lab testing on combined sample (S01C, S01B, S01A, S02B, S02A, and S03A)

Figures



Former Nursery Detention Basin
Fairfax, California

County of Marin Flood Control and Water Conservation District

GEI Consultants

Site Vicinity

FEBRUARY 2017

FIGURE 1

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Former Nursery Detention Basin Project
Fairfax, California

County of Marin Flood Control and Water Conservation District

GEI Consultants

SITE PLAN

FEBRUARY 2017

FIGURE 2

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Appendix A

Boring Logs

BORING LOG LEGEND

SOIL DESCRIPTION

CA - CHEMICAL ANALYSIS (CORROSIVITY)
CD - CONSOLIDATED DRAINED TRIAXIAL
CN - CONSOLIDATION
CU - CONSOLIDATED UNDRAINED TRIAXIAL
DS - DIRECT SHEAR
PP - Q_p FROM POCKET PENETROMETER
TV - S_u FROM TORVANE
RV - R-VALUE

PENETRATION RESISTANCE (RECORDED AS BLOWS / 0.5 FT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	COMPRESSIVE STRENGTH (TSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.50
MEDIUM DENSE	10 - 30	FIRM	4 - 8	0.50 - 1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

SAMPLE TYPES

- Auger Cutting
- Grab Sample
- California Sample
- Modified California Sample
- 2.5" Modified California Sample
- Core Sample
- Split Spoon Sample
- Direct Push Sample
- Sonic Sample
- Undisturbed Sample
- Field Vane Shear
- Punch Core Sample

ADDITIONAL TESTS

CA - CHEMICAL ANALYSIS (CORROSIVITY)
CD - CONSOLIDATED DRAINED TRIAXIAL
CN - CONSOLIDATION
CU - CONSOLIDATED UNDRAINED TRIAXIAL
DS - DIRECT SHEAR
PP - POCKET PENETROMETER (TSF)
(3.0) - (WITH SHEAR STRENGTH IN KSF)
RV - R-VALUE
SA - SIEVE ANALYSIS: % PASSING #200 SIEVE
▽ - WATER LEVEL (WITH DATE OF) MEASUREMENT
(200) - (WITH % PASSING NO. 200 SIEVE
SW - SWELL TEST
TC - CYCLIC TRIAXIAL
TV - TORVANE SHEAR
UC - UNCONFINED COMPRESSION
(1.5) - (WITH SHEAR STRENGTH IN KSF)
UU - UNCONSOLIDATED UNDRAINED TRIAXIAL
WA - WASH ANALYSIS
(200%) - (WITH % PASSING NO. 200 SIEVE)

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-98)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants
GEI Consultants, Inc.
180 Grand Avenue Suite 1410
Oakland, CA 94612
(510) 350-2900

Boring Location

LATITUDE: 38.002706 **LONGITUDE:** -122.610379 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 233.9
LOCATION: Former Nursery Site

BORING
MW#1

Drilling Information

DATE START / END: 8/3/2016 - 8/3/2016 **TOTAL DEPTH (FT):** 21.2
CONTRACTOR: Gregg Drilling & Testing **DRILLER:** E. Santellan **LOGGED BY:** T. Haynes
EQUIPMENT: Mobile B-53 (Gregg Rig No. D-26) **BORING METHOD:** Hollow Stem Auger
AUGER ID/OD: OD - 8-inch **CASING ID/OD:** N/A / N/A **DRILL ROD TYPE/SIZE:** Drill Rod Type - NWJ
HAMMER TYPE: Automatic Hammer **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Not Encountered **HAMMER ENERGY MEASUREMENT (%):** 76
GENERAL NOTES:

ABBREVIATIONS: ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample; U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core; WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; Q_P = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./ Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	GRAPHIC LOG	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
	0		S01B, S01A	18/12	10 10 11 [21]/ {27}	Q_P=>4.5		Lean CLAY (CL); hard; light olive brown (2.5Y 5/3); dry to moist; >95% medium plasticity, high dry strength, no to slow dilatency, medium toughness fines; <5% fine sand; trace fine gravel.			56			Lab testing on combined sample (S01B, S01A, S02B, S02A, S03B, and S03A) Additional sampler (Samples S03B and S03A) driven from 0.0 to 1.5 feet for environmental sample approx. 1 foot east of boring
			S02B, S02A	18/12	6 9 10 [19]/ {24}			Clayey GRAVEL with Sand (GC); medium dense; olive brown (2.5Y 4/4); dry to moist; 40% fine, subangular gravel, max. size 1/2-in.; 30% fine to coarse sand; 30% low plasticity fines.						
230	5		S04A	18/7	2 3 5 [8]/ {10}			Sandy Lean CLAY (CL); medium stiff; very dark gray (7.5YR 3/1) mottled with orange; moist; 61% high dry strength, no dilatency, medium toughness fines; 31% fine to coarse sand; 8% fine gravel.						
			S05A	18/6	2 2 4 [6]/ {8}	Q_P=0.75					61	30	11	
225	10		S06A	18/7	4 5 7 [12]/ {15}	Q_P=0.75								
220			S07B, S07A	18/6	6 11 18 [29]/ {37}	Q_P=2.75 Q_P=4.25		Below 13 feet: very stiff to hard.						
	15		S08A	18/6	15 16 20 [36]/ {46}									
								CLAYSTONE; light gray; intensely weathered to decomposed; very weak.						
215			S09A	9/7	40 50/4"									
	20			2/0	50/2"									
								End of Boring at 21.2 feet.						
210	25													
205														

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location

LATITUDE: 38.002290 **LONGITUDE:** -122.610757 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 234.6
LOCATION: Former Nursery Site

BORING

MW#2

Drilling Information

DATE START / END: 8/4/2016 - 8/4/2016 **TOTAL DEPTH (FT):** 22.3
CONTRACTOR: Gregg Drilling & Testing **DRILLER:** E. Santellan **LOGGED BY:** T. Haynes
EQUIPMENT: Mobile B-61 (Gregg Rig No. D-12) **BORING METHOD:** Hollow Stem Auger
AUGER ID/OD: OD - 8-inch **CASING ID/OD:** N/A / N/A **DRILL ROD TYPE/SIZE:** Drill Rod Type - AWJ
HAMMER TYPE: Automatic Hammer **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Not Encountered **HAMMER ENERGY MEASUREMENT (%):** 69
GENERAL NOTES:

ABBREVIATIONS: ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample; U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core; WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; Q_P = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./ Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	GRAPHIC LOG	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
			S01B, S01A	18/14	18 10 7 [17]/ {20}			Clayey SAND with Gravel (SC); loose to medium dense; light olive brown (2.5Y 5/3); dry; 47% fine to coarse sand; 34% low plasticity fines; trace rootlets at surface; 18% fine, subangular gravel, max. size 3/4-in.			34			Lab testing on combined sample (S01B, S01A, S02B, S02A, S03B, and S03A) Additional sampler (Samples S03B and S03A) driven from 1.5 to 3.0 feet for environmental sample approx. 1 foot northwest of boring
			S02B, S02A	18/12	4 4 4 [8]/ {9}									
230	5		S04A	18/6	2 2 2 [4]/ {5}	Q_P=<0.5		Silty SAND (SM); loose; dark yellowish brown (10YR 3/6); moist; 62% fine sand; 38% slow dilatency, low to medium toughness fines.			38	24	NP	
			S05A	18/5	2 2 3 [5]/ {6}									
225	10		S06A	18/10	1 2 2 [4]/ {5}	Q_P=0.5		Lean CLAY (CL); soft; very dark grayish brown (2.5Y 3/2); moist; 95% medium to high dry strength, no dilatency, medium toughness fines; 5% fine sand; trace fine gravel/coarse sand.						
			S07A	18/10	2 4 7 [11]/ {13}	Q_P=1.25		Below 13 feet: stiff.				32	12	
220	15		S08B, S08A	18/10	2 3 5 [8]/ {9}			Sandy Lean CLAY (CL); dark grayish brown (2.5Y 4/2); moist; 60% low to medium plasticity, no to slow dilatency, medium toughness fines; 40% fine sand.						
			S09A	18/9	4 5 8 [13]/ {15}	Q_P=4.5		Clayey SAND with Gravel (SC); medium dense; dark yellowish brown (10YR 3/4); moist; 48% fine to coarse sand; 35% fine to coarse, subangular gravel; 17% low to medium plasticity fines.						
215	20		S10A	18/11	5 8 9 [17]/ {20}	Q_P=3					17			
								End of Boring at 22.3 feet.						
210	25													
205														

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location

LATITUDE: 38.002185 **LONGITUDE:** -122.610332 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 232.9
LOCATION: Former Nursery Site

BORING
MW#3

Drilling Information

DATE START / END: 8/3/2016 - 8/4/2016 **TOTAL DEPTH (FT):** 21.5
CONTRACTOR: Gregg Drilling & Testing **DRILLER:** E. Santellan **LOGGED BY:** T. Haynes
EQUIPMENT: Mobile B-53 (Gregg Rig No. D-26) **BORING METHOD:** Hollow Stem Auger
AUGER ID/OD: OD - 8-inch, 10-inch **CASING ID/OD:** N/A / N/A **DRILL ROD TYPE/SIZE:** Drill Rod Type - NWJ
HAMMER TYPE: Automatic Hammer **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Not Encountered **HAMMER ENERGY MEASUREMENT (%):** 76
GENERAL NOTES:

ABBREVIATIONS: ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample; U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core; WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; Q_P = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Sample No.	Pen./Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
232.9	0	S01B, S01A	18/12	16, 4, 8 [12]/{15}		Silty, Clayey SAND with Gravel (SC-SM); loose to medium dense; dark brown (10YR 3/3); dry to moist; 51% fine to coarse sand; 29% fine to coarse, subangular gravel; 20% fines.			20			Lab testing on combined sample (S01B, S01A, S02A, S03C, S03B, and S03A) Additional sampler (Sample S02A) driven from 0.0 to 1.5 feet for environmental sample approx. 1 foot southeast of boring
230		S03C, S03B, S03A	18/18	4, 5, 5 [10]/{13}		Below 2.7 feet: moist.						
	5	S04A	18/8	7, 6, 4 [10]/{13}		Below 5 feet: 43% sand; 42% gravel; 15% fines.			15	23	7	
225		S05A	18/10	1, 1, 1 [2]/{3}	Q_P=<0.5	Lean CLAY (CL); very soft to soft; very dark gray (7.5YR 3/1) mottled with orange; moist; 90% low to medium plasticity, medium to high dry strength, no dilatency, low to medium toughness fines; 10% fine sand.						
	10	S06A	18/5	0, 1, 1 [2]/{3}	Q_P=<0.5							
220		S07A	18/12	0, 1, 2 [3]/{4}	Q_P=<0.5	Sandy Lean CLAY (CL); very soft to soft; very dark gray (7.5YR 3/1) mottled with orange; moist; 57% no dilatency, low to medium toughness fines; 42% fine to coarse sand; 1% fine gravel.			57	32	13	
	15	S08A	18/8	5, 7, 9 [16]/{20}	Q_P=3.5	Clayey GRAVEL with Sand (GC); medium dense; dark brown (10YR 3/3) mottled with red and orange; moist to wet; 49% fine to coarse, subangular gravel, max. size 1-in.; 32% fine to coarse sand; 20% medium toughness fines.			20	31	13	
215		S09A	18/6	4, 7, 7 [14]/{18}								
	20	S10A	18/11	4, 6, 10 [16]/{20}	Q_P=2.5							
210						End of Boring at 21.5 feet. Reemed borehole with 10-inch auger for well installation.						
	25											
205												

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location		**BORING**
LATITUDE: 38.001803 **LONGITUDE:** -122.609618 **STATION:** - **OFFSET (FT):** -		**SB#1**
HORIZONTAL DATUM: NAD 83	**STATION CENTERLINE:** -	**PAGE 1 of 1**
VERTICAL DATUM: NAVD 88	**GROUND SURFACE ELEVATION (FT):** 229.6	
LOCATION: Former Nursery Site		

Drilling Information

DATE START / END:	8/4/2016 - 8/4/2016			**TOTAL DEPTH (FT):**	29.0
CONTRACTOR:	Gregg Drilling & Testing	**DRILLER:**	E. Santellan	**LOGGED BY:**	T. Haynes
EQUIPMENT:	Mobile B-61 (Gregg Rig No. D-12)			**BORING METHOD:**	Hollow Stem Auger
AUGER ID/OD:	OD - 6-inch	**CASING ID/OD:**	N/A / N/A	**DRILL ROD TYPE/SIZE:**	Drill Rod Type - AWJ
HAMMER TYPE:	Automatic Hammer	**HAMMER WEIGHT (lbs):**	140	**HAMMER DROP (inch):**	30
WATER LEVEL DEPTHS (ft):	Not Encountered			**HAMMER ENERGY MEASUREMENT (%):**	69
GENERAL NOTES:					

ABBREVIATIONS:

ID = Inside Diameter	bpf = Blows per Foot	U = Undisturbed Tube Sample	WOR = Weight of Rods	Q_P = Pocket Penetrometer Strength
OD = Outside Diameter	mpf = Minute per Foot	C = Rock Core	WOH = Weight of Hammer	S_v = Pocket Torvane Shear Strength
Pen. = Penetration Length	S = Split Spoon	V = Field Vane Shear	RQD = Rock Quality Designation	F_v = Field Vane Shear Strength
Rec. = Recovery Length	DP = Direct Push Sample	SC = Sonic Core	OVM = Organic Vapor Meter	NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./ Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	GRAPHIC LOG	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
		X	S01A	18/11	11 7 5 [12]/ {14}			Lean CLAY (CL); stiff; dark brown (7.5YR 3/2); dry to moist; 90% low plasticity, no dilatency, medium toughness fines; 10% fine, trace coarse sand; trace rootlets/plant fibers.						
		X	S02B, S02A	18/7	6 5 4 [9]/ {10}			Lean CLAY (CL); stiff; dark yellowish brown (10YR 3/4) speckled with orange and red; moist; 95% no dilatency, medium toughness fines; 5% fine sand; trace organics.						
225	5	X	S03A	18/6	4 5 4 [9]/ {10}	Q_P=2.5		Below 5 feet: stiff to very stiff.				29	10	
		X	S04A	18/4	3 4 6 [10]/ {12}	Q_P=2		Lean CLAY (CL/CH); stiff to very stiff; dark olive brown (2.5Y 3/3); moist; >95% medium plasticity, no dilatency, medium to high toughness fines; <5% fine sand.						
220	10	X	S05A	18/8	3 3 3 [6]/ {7}	Q_P=0.75		Lean CLAY (CL); medium stiff; very dark grayish brown (2.5Y 3/2) mottled with orange; moist; >95% no dilatency, medium toughness fines; <5% fine sand.				31	11	
		X	S06A	18/10	0 0 0 [0]/ {0}			Silty, Clayey SAND (SC-SM); very loose; dark olive brown (2.5Y 3/3); moist; 53% fine sand; 47% slow dilatency, medium toughness fines.			47	25	7	
215	15	X	S07A	18/7	1 1 2 [3]/ {3}	Q_P=<0.5		Lean CLAY (CL); soft; very dark grayish brown (2.5Y 3/2) mottled with orange; moist; 95% low plasticity, no dilatency, low to medium toughness fines; 5% fine sand.						
		X	S08A	18/9	1 4 5 [9]/ {10}	Q_P=0.75		Lean CLAY (CL); medium stiff to stiff; dark olive brown (2.5Y 3/3); moist; 95% medium plasticity, no dilatency, medium toughness fines; 5% fine sand.						
210	20	X	S09A	18/9	4 6 10 [16]/ {18}	Q_P=1.5								
		X	S10A	18/11	3 6 12 [18]/ {21}			Clayey SAND with Gravel (SC); medium dense; olive brown (2.5Y 4/3); moist; 49% fine to coarse sand; 34% fine to coarse, subangular to angular gravel, max. size 1-in.; 17% fines.			17	27	9	
205	25	X	S11A	18/8	5 7 6 [13]/ {15}									
		X	S12A	18/10	6 8 9 [17]/ {20}			Below 27.5 feet: 50% sand, 36% gravel, 14% fines.			14			
200								End of Boring at 29 feet.						

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location

LATITUDE: 38.001257 **LONGITUDE:** -122.609780 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 235.6
LOCATION: North Side of Sir Francis Drake Boulevard, 600 feet West of Shadow Creek Court

BORING

SB#2

Drilling Information

DATE START / END: 8/4/2016 - 8/4/2016 **TOTAL DEPTH (FT):** 31.5
CONTRACTOR: Gregg Drilling & Testing **DRILLER:** E. Santellan **LOGGED BY:** T. Haynes
EQUIPMENT: Mobile B-61 (Gregg Rig No. D-12) **BORING METHOD:** Hollow Stem Auger
AUGER ID/OD: OD - 6-inch **CASING ID/OD:** N/A / N/A **DRILL ROD TYPE/SIZE:** Drill Rod Type - AWJ
HAMMER TYPE: Automatic Hammer **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Not Encountered **HAMMER ENERGY MEASUREMENT (%):** 69
GENERAL NOTES:

ABBREVIATIONS: ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample; U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core; WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; Q_P = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
235		X	S01A	18/8	19 17 18 [35]/ {40}	Q_P=>4.5	Clayey SAND with Gravel (SC); dense; olive brown (2.5Y 4/3); dry to moist; 51% fine to coarse sand; 29% no to slow dilatency, low to medium toughness fines; 13% fine gravel.			29	26	8	
		X	S02A	18/8	3 4 6 [10]/ {12}		Below 2.5 feet: medium dense						
230	5	X	S03A	18/8	3 6 4 [10]/ {12}	Q_P=>4.5	Lean CLAY with Sand (CL); hard; brown (10YR 4/3); moist; 85% low to medium plasticity, no dilatency, medium toughness fines; 15% fine to medium sand; trace rootlets.						
		X	S04A	18/9	4 7 9 [16]/ {18}		Clayey SAND (SC); medium dense; brown (10YR 4/3); moist; 63% fine to medium sand; 25% low to medium plasticity fines; 12% fine gravel; trace rootlets.			25			
225	10	X	S05A	18/9	6 11 13 [24]/ {28}		Lean CLAY (CL); very stiff; dark brown (10YR 3/3); moist; 90% medium plasticity, no dilatency, medium toughness fines; 10% fine sand. At 10.7 feet: 1" hard nodule.						
		X	S06A	18/8	3 4 7 [11]/ {13}	Q_P=2.5	Lean CLAY (CL); stiff to very stiff; very dark gray (2.5Y 3/1) mottled orange and red; moist; 90% no dilatency, medium toughness fines; 10% medium sand.				27	9	
220	15	X	S07A	18/8	4 5 7 [12]/ {14}	Q_P=2							
		X	S08A	18/9	6 9 12 [21]/ {24}	Q_P=3.5	Below 17.5 feet: increased plasticity, medium to high toughness fines.						
215	20	X	S09A	18/9	5 7 13 [20]/ {23}	Q_P=2.75							
		X	S10A	18/6	8 6 10 [16]/ {18}		Fat CLAY with Gravel (CH); very stiff; dark olive brown (2.5Y 5/3); moist; 80% high plasticity, no dilatency, high toughness fines; 20% fine gravel.						
210	25	X	S11A	18/6	7 9 12 [21]/ {24}	Q_P=3.5	Lean CLAY (CL); very stiff; dark olive gray (5Y 3/2); moist; 95% medium to high plasticity, no dilatency, medium to high toughness fines; 5% fine sand.						
		X	S12A	18/9	8 17 20 [37]/ {43}	Q_P=>4.5	Lean CLAY (CL); hard; very dark gray (5Y 3/1) mottled with light gray; moist; 95% no dilatency, medium to high toughness fines; 5% fine sand; shows rock structure.				47	26	

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location

LATITUDE: 38.001257 **LONGITUDE:** -122.609780 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 235.6
LOCATION: North Side of Sir Francis Drake Boulevard, 600 feet West of Shadow Creek Court

BORING

SB#2

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./ Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	GRAPHIC LOG	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
205		X	S13A	18/8	10 17 21 [38]/ {44}	Q_P=>4.5		Lean CLAY (CL) as above.						
								End of Boring at 31.5 feet.						
200	35													
195	40													
190	45													
185	50													
180	55													
175	60													
170	65													

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Boring Location

LATITUDE: 38.002569 **LONGITUDE:** -122.610630 **STATION:** - **OFFSET (FT):** -
HORIZONTAL DATUM: NAD 83 **STATION CENTERLINE:** -
VERTICAL DATUM: NAVD 88 **GROUND SURFACE ELEVATION (FT):** 234.9
LOCATION: Former Nursery Site

BORING

SB#3

Drilling Information

DATE START / END: 8/4/2016 - 8/4/2016 **TOTAL DEPTH (FT):** 3.0
CONTRACTOR: Gregg Drilling & Testing **DRILLER:** E. Santellan **LOGGED BY:** T. Haynes
EQUIPMENT: Mobile B-61 (Gregg Rig No. D-12) **BORING METHOD:** Hollow Stem Auger
AUGER ID/OD: OD - 6-inch **CASING ID/OD:** N/A / N/A **DRILL ROD TYPE/SIZE:** Drill Rod Type - AWJ
HAMMER TYPE: Automatic Hammer **HAMMER WEIGHT (lbs):** 140 **HAMMER DROP (inch):** 30
WATER LEVEL DEPTHS (ft): Not Encountered **HAMMER ENERGY MEASUREMENT (%):** 69
GENERAL NOTES:

ABBREVIATIONS: ID = Inside Diameter; OD = Outside Diameter; Pen. = Penetration Length; Rec. = Recovery Length; bpf = Blows per Foot; mpf = Minute per Foot; S = Split Spoon; DP = Direct Push Sample; U = Undisturbed Tube Sample; C = Rock Core; V = Field Vane Shear; SC = Sonic Core; WOR = Weight of Rods; WOH = Weight of Hammer; RQD = Rock Quality Designation; OVM = Organic Vapor Meter; Q_P = Pocket Penetrometer Strength; S_v = Pocket Torvane Shear Strength; F_v = Field Vane Shear Strength; NA, NM = Not Applicable, Not Measured

Elev. (ft)	Depth (ft)	Type	Sample No.	Pen./ Rec. (in)	Blows per 6 in. [bpf] / {N60}	Field Test Data (tsf)	GRAPHIC LOG	Sample Description & Classification	Moisture Content (%)	Dry Density (pcf)	Fines % <#200	LL	PI	Remarks
			S01C, S01B, S01A	18/18	32 21 14 [35]/ {40}			Clayey SAND with Gravel (SC); medium dense to dense; dark yellowish brown (10YR 3/4); dry to moist; 40% fine to coarse sand; 33% low to medium fines; 28% fine, subrounded to subangular gravel, max. size 3/4-in.			33			Lab testing on combined sample (S01C, S01B, S01A, S02B, S02A, and S03A)
			S02B, S02A	18/12	8 9 11 [20]/ {23}									
								End of Boring at 3 feet.						Additional sampler (Sample S03A) driven from 1.5 to 3.0 feet for environmental sample approx. 1 foot northeast of boring
230	5													
225	10													
220	15													
215	20													
210	25													

Strata lines represent the approximate boundaries between soil types. Actual transitions may be gradual. Water level readings have been made at times stated. Water levels may be different at other times.

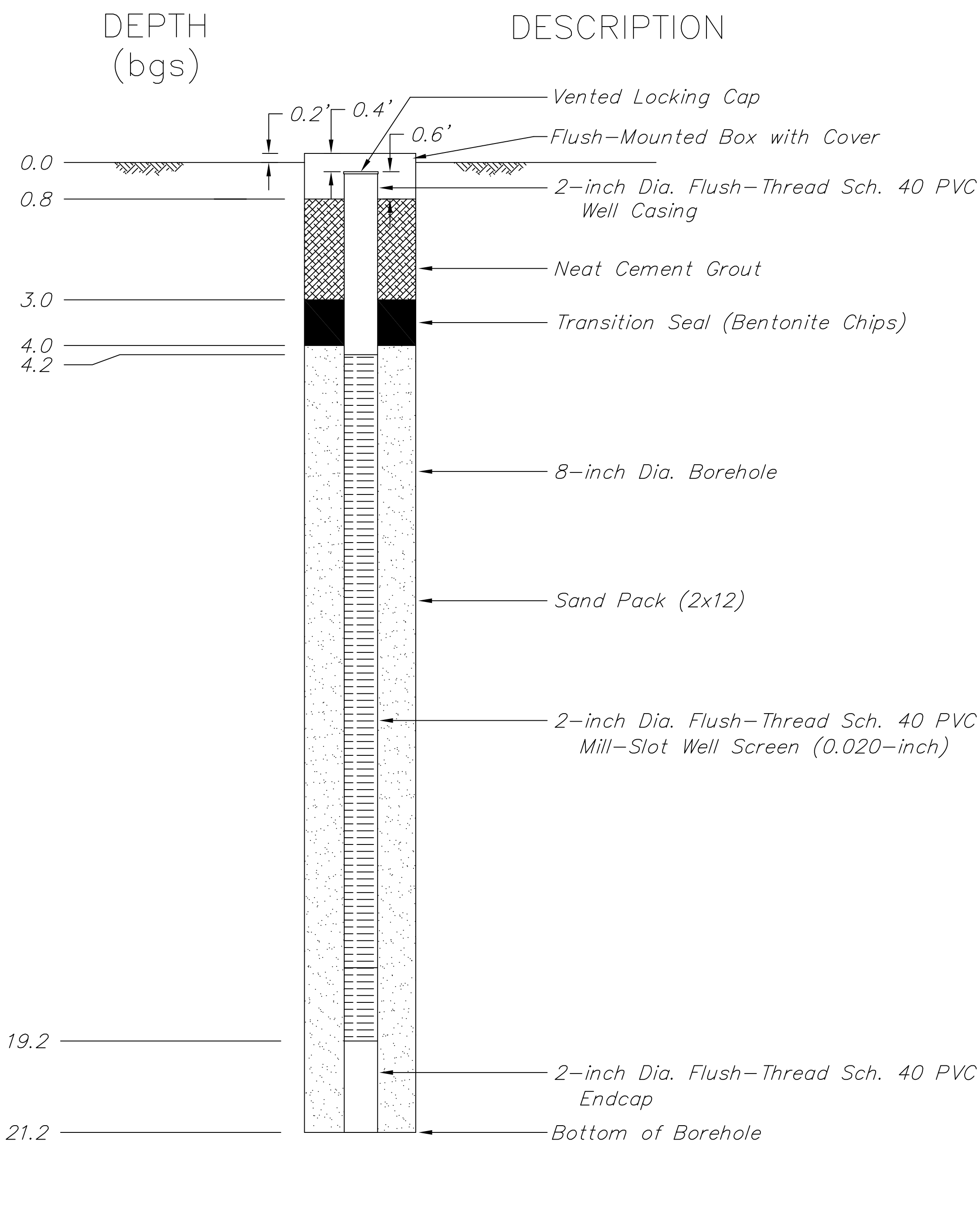
CLIENT: Marin County Flood Control & Water Conservation District
PROJECT NAME: Former Nursery Detention Basin
CITY/STATE: Fairfax, California
GEI PROJECT NUMBER: 1610277

GEI Consultants

Appendix B

Monitoring Well As-Builts

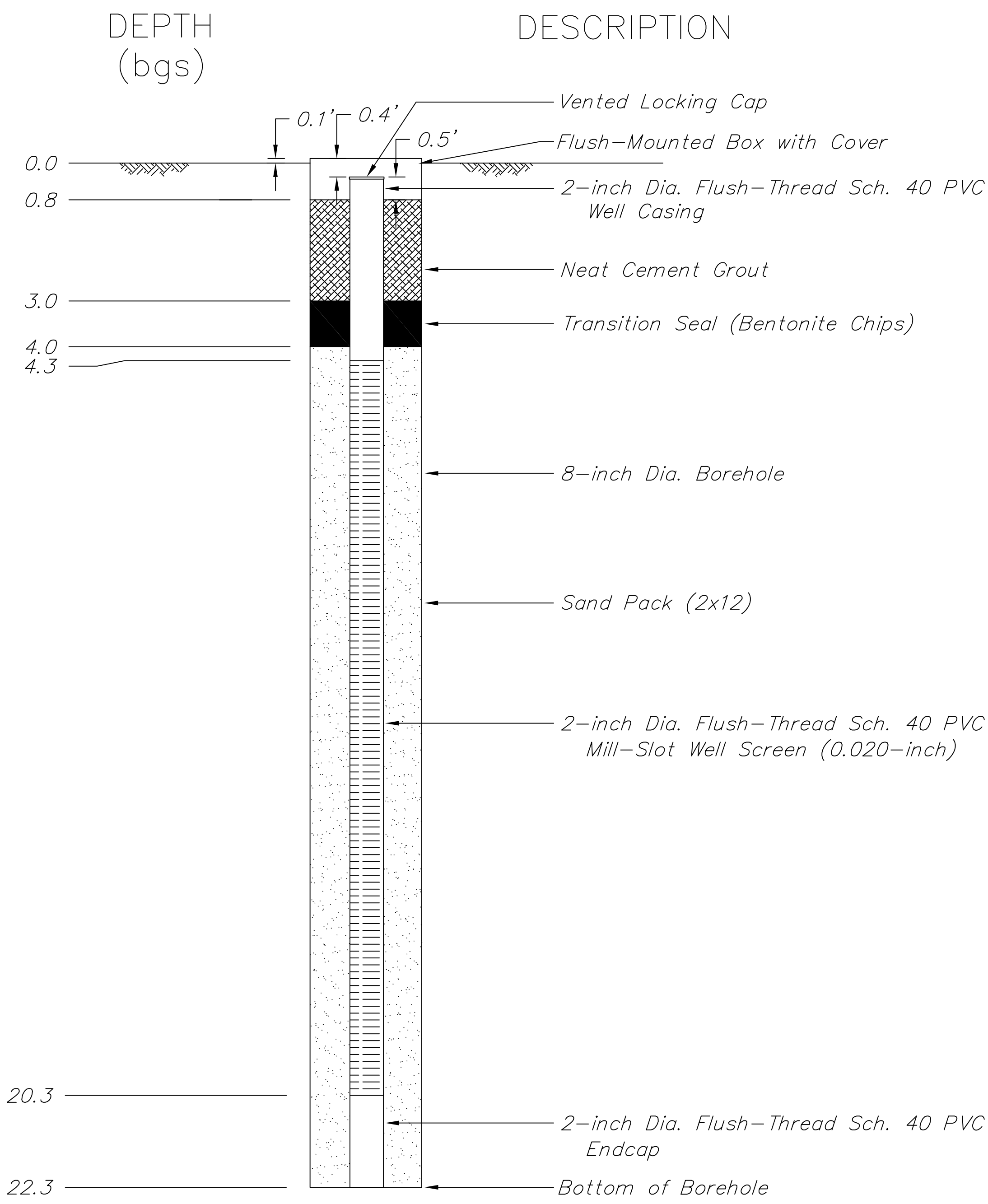
AS-BUILT CONSTRUCTION DETAILS FOR MW-1



(HORIZONTAL: NOT TO SCALE)

Former Nursery Detention Basin Fairfax, California	GEI Consultants	MW-1 AS- BUILT DETAILS
County of Marin Flood Control and Water Conservation District	Project 1610277	December 2016 Figure B-1

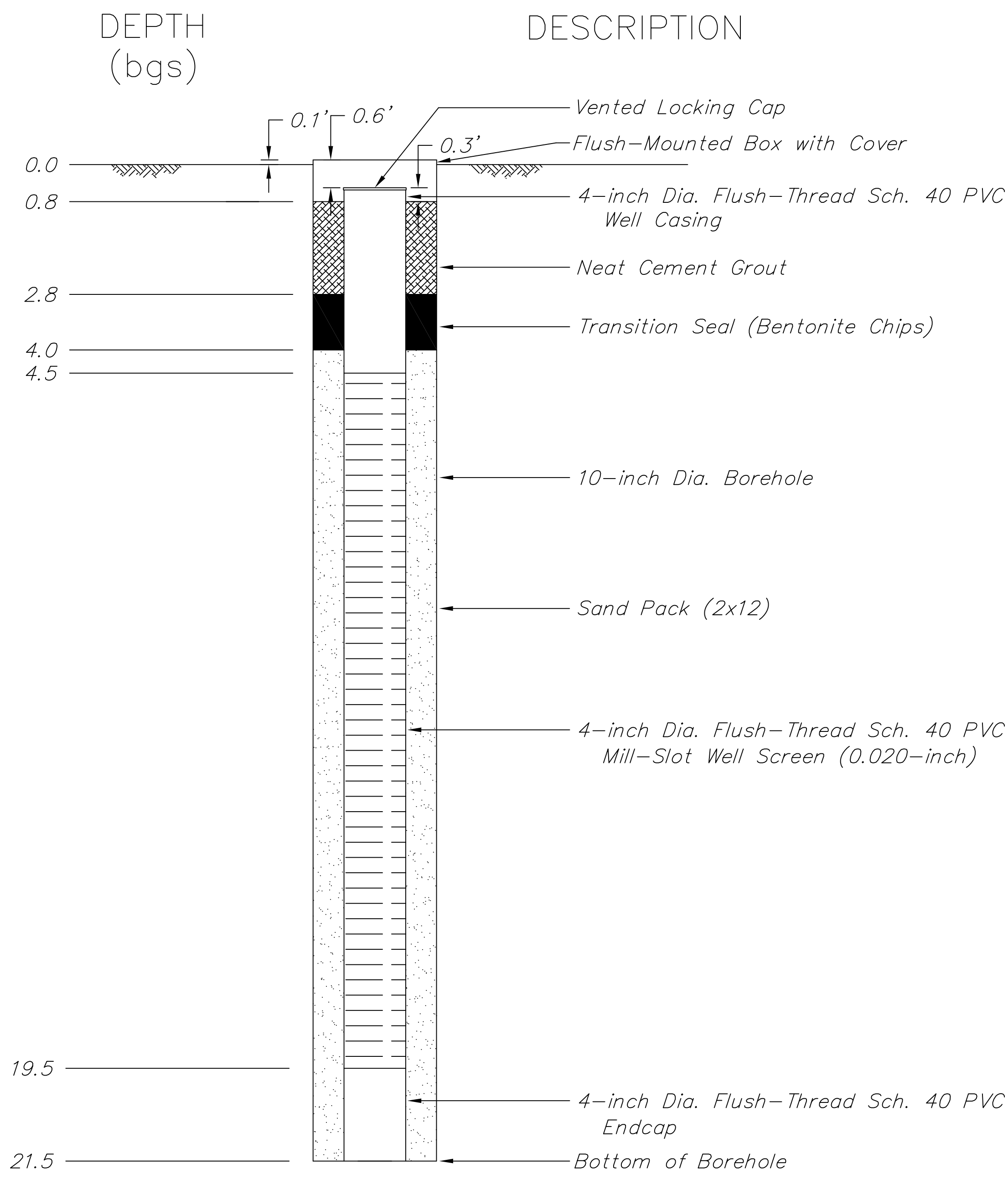
AS-BUILT CONSTRUCTION DETAILS FOR MW-2



(HORIZONTAL: NOT TO SCALE)

Former Nursery Detention Basin Fairfax, California	GEI Consultants	MW-2 AS- BUILT DETAILS
County of Marin Flood Control and Water Conservation District	Project 1610277	December 2016 Figure B-2

AS-BUILT CONSTRUCTION DETAILS FOR MW-3



(HORIZONTAL: NOT TO SCALE)

Former Nursery Detention Basin Fairfax, California	GEI Consultants	MW-3 AS- BUILT DETAILS
County of Marin Flood Control and Water Conservation District	Project 1610277	December 2016 Figure B-3