SAN ANSELMO FLOOD RISK REDUCTION PROJECT

Final Environmental Impact Report
Volume 2 - Response to Comments
State Clearinghouse No. 2017042041

Prepared for
Marin County Flood Control and Water Conservation District

August 2018

ESA

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CHAPTER 1
Introduction

1.1 Introduction to the Comments and Responses

After completion of a draft environmental impact report (EIR), the California Environmental Quality Act (CEQA) requires the Lead Agency to consult with and obtain comments from public agencies that have legal jurisdiction with respect to the proposed project, and to provide the general public with opportunities to comment on the Draft EIR. CEQA also requires the Lead Agency to respond to significant environmental issues raised in the review and consultation process. The Lead Agency for the San Anselmo Flood Risk Reduction Project EIR is the Marin County Flood Control and Water Conservation District (Flood Control District).

The San Anselmo Flood Risk Reduction Project Draft EIR (SCH# 2017042041) was released for public review and comment on May 18, 2018. The Flood Control District circulated the Draft EIR for review by public agencies, interested parties, and organizations for a 45-day public comment period, which ended on July 2, 2018. During the comment period, the Board of Supervisors held a Public Hearing on May 22, 2018, to take public comment on the Draft EIR. The County received 50 comment letters in addition to oral testimony at the public hearing.

This document contains all comments received during the comment period, as well as responses to these comments, and together with the Draft EIR, will constitute the Final EIR if the Marin County Board of Supervisors certifies the Final EIR as complete and adequate under CEQA. A list of those who commented on the Draft EIR appears in **Table RTC 1-1**. The list is divided into government agencies, organizations, and individuals.

1.2 Document Organization

The Response to Comments document consists of the following chapters:

- **Chapter 1, Introduction.** This chapter discusses the purpose and organization of this document, as well as a list of agencies, organizations, and persons who submitted written comments or offered oral comments on the Draft EIR.
- **Chapter 2, Master Responses.** This chapter contains consolidated responses to issues raised by multiple commenters.
- **Chapter 3, Comments and Responses.** This chapter contains reproductions of all comment letters received on the Draft EIR, as well as oral comments received on the Draft EIR. A

written response for each CEQA-related comment received during the review period is provided. Each response is keyed to its respective comment.

- **Chapter 4, Draft EIR Text Revisions.** Corrections to the Draft EIR necessary in light of comments received and responses provided, or necessary to clarify any minor errors, omissions, or misinterpretations, are contained in this chapter.
- **Chapter 5, Report Preparers and References.** A summary of those involved in report preparation and a list of the references cited are contained in this chapter.

TABLE RTC 1-1
LIST OF COMMENTERS

Letter Designation	Letter Date	Date Received	Agency or Organization	Commenter's First Name	Commenter's Last Name
Federal Agencies					
A1	07-06-2018	07-06-2018	**National Oceanic and Atmospheric Administration**	Sara	Azat
State Agencies					
A2	06-28-2018	07-02-2018	**California Department of Fish and Wildlife**	Gregg	Erickson
A3	07-02-2018	07-02-2018	**San Francisco Bay Regional Water Quality Control Board**	Xavier	Fernandez
Regional and Local Agencies					
A4	06-25-2018	07-02-2018	**Town of Ross**	Joe	Chinn
A5	07-02-2018	07-02-2018	**Town of Fairfax**	Ben	Berto
A6	07-02-2018	07-02-2018	**City of Larkspur**	Julian	Skinner
A7	07-02-2018	07-02-2018	**Town of San Anselmo**	Sean	Condry
Organizations					
B1	07-01-2018	07-02-2018	**Friends of Corte Madera Creek Watershed**	Cindy	Lowney
B2	07-02-2018	07-02-2018	**Marin Audubon Society**	Barbara Phil	Salzman Peterson
B3	06-29-2018	07-02-2018	**Marin Conservation League**	Linda J.	Novy
Individuals					
C1	06-26-2018	07-02-2018		Ross	Asselstine
C2	06-29-2018	07-02-2018		Ross	Asselstine
C3	06-29-2018	07-02-2018		Ross	Asselstine
C4	07-02-2018	07-02-2018		Ross	Asselstine
C5	06-11-2018	07-02-2018		Karl	Baeck
C6	06-30-2018	07-02-2018	**Brekhus Law Partners**	Elizabeth	Brekhus
C7	05-23-2018	07-02-2018		Holly	Burgess
C8	06-06-2018	07-02-2018		Holly	Burgess
C9	05-19-2018	07-02-2018		John C.	Crane
C10	05-19-2018	07-02-2018		John C.	Crane
C11	06-29-2018	07-02-2018		John C.	Crane
C12	06-29-2018	07-02-2018		John C.	Crane
C13	07-02-2018	07-02-2018		Jennifer	Dickinson
C14	07-01-2018	07-02-2018		Roger	Farrow
C15	05-19-2018	07-02-2018		Greg	Finch
C16	06-29-2018	07-02-2018		John	Fitzpatrick

TABLE RTC 1-1 (CONTINUED)
LIST OF COMMENTERS

Letter Designation	Letter Date	Date Received	Agency or Organization	Commenter's First Name	Commenter's Last Name
C17	07-02-2018	07-02-2018		Ella Foley	Gannon
C18	06-25-2018	07-02-2018		Carolyn	Handelin
C19	06-24-2018	07-02-2018		Charles	Handelin
C20	07-02-2018	07-02-2018	**Marten Law**	Kevin T.	Haroff
C21	06-13-2018	07-02-2018		Brian	Hennessy
C22	06-29-2018	07-06-2018		James	Holmes
C23	06-29-2018	07-02-2018		Gypsy	Horsted
C24	07-02-2018	07-02-2018		William	Lukach
C25	07-02-2018	07-02-2018		Peter	Maguire
C26	06-11-2018	07-02-2018		Frank	Malin
C27	06-14-2018	07-02-2018		Julie	McMillan
C28	6-30-2018	07-02-2018		Glenn & Laura	Miwa
C29	06-25-2018	07-02-2018		Nancy	Oswald
C30	06-27-2018	07-02-2018		Nancy	Oswald
C31	07-02-2018	07-02-2018		Garril	Page
C32	07-02-2018	07-02-2018		Martha	Richter Smith
C33	06-28-2018	07-02-2018		Doug	Ryan
C34	06-29-2018	07-02-2018	**Rifkind Law Group**	Christopher A.	Skelton
C35	06-30-2018	07-02-2018		William	Solomon
C36	06-29-2018	07-02-2018		Travis & Stephanie	Trotter
C37	06-29-2018	07-02-2018		MIchael	Van Metre
C38	05-17-2018	07-02-2018		Linn	Walsh
C39	05-25-2018	07-02-2018		Gordon	Wright
C40	05-21-2018	07-02-2018		John	Wright
Public Hearing					
PH	05-22-2018			Olivier	
			Town of Fairfax	Bruce	Ackerman
				Ross	Asselstine
			Town of Ross	Elizabeth	Brekhus
				John	Crane
				Linda	Gridley
			Friends of Corte Madera Watershed	Sandy	Guldman
			City of Larkspur	Dan	Hilmer
			Town of Ross	Julie	McMillan
			Town of Ross	Richard	Simonitch

CHAPTER 2
Master Responses

2.1 List of Master Responses

Several issues were addressed by multiple commenters. "Master Responses," which consolidate information on these subjects to ensure a more comprehensive response, are presented in this chapter. The following Master Responses are discussed in this Chapter:

Master Response 1: Project Merits

Master Response 2: Socioeconomic Effects

Master Response 3: Future Design Details

Master Response 4: Program-Project Relationship

Master Response 5: Flood Modeling

Master Response 6: Changes in Flood Risk and Flood Risk Mitigation

Master Response 7: Erosion, Sedimentation, and Channel Maintenance

2.2 Master Responses

2.2.1 Master Response 1: Project Merits

The comments and corresponding responses in this section relate to merits of the project. Multiple commenters remarked on project merits. This response addresses comments on the following topics:

- The reduction in flooding is not worth the potential downstream flooding impacts
- The reduction in flooding is not worth effects to businesses
- Approving the project with increased flooding on private property is wrong
- The Flood Control District should focus should be on reducing damage due to flooding instead of reducing flooding
- The cost of the project (or that of the Ross Valley Flood Protection and Watershed Program) is too high to justify it
- Support for the project

The comments do not address the adequacy or accuracy of the EIR; rather, the comments speak to the merits of the proposed San Anselmo Flood Risk Reduction Project. The comments will be transmitted to Flood Control District decision-makers for consideration in their deliberations on whether to approve the proposed Project.

2.2.2 Master Response 2: Socioeconomic Effects

Several comment letters included questions about the Project's costs or its benefit-to-cost ratio, financial liability and/or funding related to the Project's implementation, operations and maintenance, possible failure, changes in insurance rates or property values, costs of disruptions to water supplies, or other aspects of construction. Many of these comments were particular to the flood barriers proposed as a mitigation measure. The measures intended to serve as flood barriers are clarified in Master Response 6, Changes in Flood Risk and Flood Risk Mitigation.

In accordance with the California Environmental Quality Act (CEQA), the Draft EIR evaluated the potentially significant environmental effects of the Project. Economic (e.g., financial liability, property values) and social or quality-of-life effects of a project are not considered environmental impacts under CEQA (State CEQA *Guidelines* Section 15131) unless there is a chain of effect from the economic or social effect to a physical change in the environment (such as impacts addressed in the Draft EIR in the air quality, traffic, and noise sections); for example, if such effects result in the need for the construction of new or physically altered facilities that would result in significant physical environmental impacts. Therefore, a project's development or implementation costs or the ratio of its economic benefits to its costs are not environmental impacts subject to CEQA analysis. Comments on economic and social effects will be transmitted to the Flood Control District and its Board of Supervisors, which are the Marin County decision-makers, for consideration in their deliberations on whether to approve the Project. The Staff Report that is being prepared for submission to the Flood Control District's Board of Supervisors will also address the non-CEQA topics such as changes in property values, liability, and flood insurance that were asked about in many comment letters.

The Flood Control District is responsible for implementation of the Project itself and for most aspects of the proposed flood barriers that were identified as mitigation measures in the Draft EIR, except as discussed in the next paragraph. Under Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, (beginning on page 4.9-56 of the Draft EIR), the Flood Control District would perform the design, installation, maintenance, and eventual removal (in those areas where such removal may eventually be appropriate) of the flood barriers. As described in Master Response 6, the Final EIR also clarifies the definition of "flood barriers" as used in Mitigation Measure 4.9-4 to include other measures that the U.S. Army Corps of Engineers and the Federal Emergency Management Agency commonly include in a category with berms and small flood walls. These measures and other aspects of the clarified text about them are discussed in Master Response 6.

Comments included many questions about details of the financial responsibilities of the Flood Control District in developing, implementing, and maintaining the flood barrier mitigation measure. While the technical details are included in Master Response 6, the responsibilities and financial details are as follows:

- For flood walls or berms at the top-of-bank of San Anselmo Creek or Fairfax Creek on privately owned parcels and with the property owners' permission, the Flood Control District would fund, design, build, and maintain all aspects of those measures, including their possible future removal if implementation of other flood risk reduction projects renders these flood walls or berms unnecessary as determined by the Flood Control District.

- For a flood barrier that involves improvements or modifications to privately owned habitable structures covered by Mitigation Measure 4.9-4 (structure elevation, wet proofing, dry proofing, basement removal and construction of an addition to house water heaters, furnaces, and similar home appliances), the Flood Control District would fully fund the design and provide funding for implementation that is proportional to the increased flood depth associated with the Project. The funding would be provided to the property owner to implement these modifications or improvements. The property owner would be responsible for construction, implementation, and future maintenance of the structure and any associated flood mitigation measures or improvements.

As noted in the text on Draft EIR Mitigation Measure 4.9-4 (page 4.9-56), the Flood Control District cannot require homeowners to agree to mitigation on private properties. As explained on page 4.9-59 of the Draft EIR, if not all property owners accept the mitigation measures, some new flooding could occur, which would be a significant and unavoidable impact. While the parcel boundaries include all or a portion of the creek channel or banks itself, and therefore these private properties cannot be completely avoided, the Flood Control District does not intend to require implementation of flood barriers on private property through an eminent domain procedure. Because implementation of flood barriers, therefore, cannot be assumed for all properties affected by the Project, the potential for new or increased flood risk is thus considered to be a significant and unavoidable impact.

2.2.3 Master Response 3: Future Design Details

Many comments include one or more requests for a level of specificity about the Project greater than that available at the current design stage. Examples of this type of comment are requests for detailed descriptions of or maps illustrating the potential flood barriers. Other comments made suggestions for a refinement or improvement to the designs included in the Draft EIR. This response is intended to explain the current state of design, the level of detail CEQA requires, the level of detail that permitting and other regulatory processes will eventually require, and the plans for developing further and more refined designs as the Project proceeds.

CEQA requires that an EIR be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences.[1] CEQA also requires that the degree of specificity required in an EIR should correspond to the degree of specificity involved in the underlying activity described in the EIR[2] and that the information contained in an EIR shall include relevant information

[1] State CEQA *Guidelines* Section 15151.
[2] State CEQA *Guidelines* Section 15146.

sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public.[3]

In this case, the Project consists of site-specific improvements that are at a preliminary design stage. These preliminary designs used in this EIR were the most detailed available at the time of analysis. While utilizing designs at this level of detail necessarily involves some degree of forecasting, CEQA recognizes that projects will have unforeseeable aspects and requires the agency to use its best efforts to find out and disclose all that it reasonably can[4]. The Flood Control District's best efforts at discovery and disclosure included sharing the appropriate design documents, basing the content of the EIR on the best available information, and distributing the Draft EIR to the general public, public agencies and other stakeholders as required by State CEQA *Guidelines* Sections 15082, 15083, 15085, 15087, and 15088.

The Flood Control District has prepared designs sufficient to comply with these guidelines, to inform the necessary environmental impact analyses, and to compare potential alternatives and the no project alternative with the current environmental baseline and in the context of expected long-term trends in the environment.

There are many flood protection methods with demonstrated flood protection performance, and there are thus many ways to mitigate Impact 4.9-4 to meet the performance standard. There is a category of mitigation measures referred to by FEMA[5] and the U.S. Army Corps of Engineers[6] as "physical non-structural measures", but that this EIR calls "flood barriers". Individual measures within that category include the flood walls and berms described in the Draft EIR, as well as raising individual structures, wet-proofing or dry-proofing structures, and others, detailed in the Master Response 6, Changes in Flood Risk and Flood Risk Mitigation. Thus, the details of Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, including detailed descriptions, designs, and specific locations or extents (to be tailored to the individually affected properties), may be left to later design or engineering stages.

Many commenters requested details of the designs for the proposed Mitigation Measure 4.9-4. State CEQA *Guidelines* Section 15126.4(a)(1)(B) describes requirements for mitigation measures, including that the measures must be fully enforceable, "roughly proportional" to the impact, and should not be deferred until a future time. Measures may also specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specific way. In this case, with one exception, the performance standard for Mitigation Measure 4.9-4 is that the project must ensure existing habitable structures would not be newly inundated by the 25-year flood event. The exception is for the measure to raise a residential structure. In accordance with local floodplain ordinances and the California Building Code, structures raised as part of reducing flood risk are required to be elevated to a 100-year level of protection. More details on this are provided in Master Response 6, Changes in

3 State CEQA *Guidelines* Section 15147.
4 State CEQA *Guidelines* Section 15144.
5 FEMA, Chapter 3, An Overview of the Retrofitting Methods, in *FEMA P-312, Homeowner's Guide to Retrofitting*, Third Edition, 2014. Available online at https://www.fema.gov/media-library/assets/documents/480, accessed August 17, 2018.
6 U.S. Army Corps of Engineers Nonstructural Flood Proofing Committee and Association of State Floodplain Managers, Nonstructural Flood Risk Management, undated.

Flood Risk and Flood Risk Mitigation. The inclusion of those measures in a certified and adopted CEQA document, adoption and incorporation of the mitigation measures into the project would make these measures enforceable.

Permitting and other regulatory processes generally require more detailed designs with more refined estimates of areas and volumes of fill or habitat conversion or gain/loss. Many of the comments from the regulatory agencies specifically request more detailed information that will be required to proceed with permitting. Regulatory agency permitting processes typically proceed with designs ranging between 30 percent and 60 percent, depending on the nature of the element and the regulation and agency involved. Accordingly, additional detail will be required for future project permitting by the regulatory agencies, as described in Draft EIR Section 1.2, Project Approvals, and in the Regulatory Setting of each section of Draft EIR Chapter 4.

2.2.4 Master Response 4: Program-Project Relationship

Several comments addressed the relationship between this EIR for the San Anselmo Flood Risk Reduction Project (i.e., the Project that is the subject of this EIR) and the EIR for the Ross Valley Flood Protection and Watershed Program (the "Ross Valley Program" or simply "Program"), primarily with regard to the timing of the two EIRs (e.g., that the Flood Control District should delay the Project until the Program, or the EIR on the Program, were completed). Other comments addressed the scope and level of detail of the Program as characterized in this EIR (e.g., suggesting that some or all of the basins currently included in the Program be excluded). Note that many of these comments do not relate to an environmental effect of the project within the scope of CEQA or the EIR. These comments have been noted for the record and have been included in the Final EIR. The Final EIR will be considered by the decision makers as part of the deliberations to approve the Project.

This is a project-level EIR for the proposed San Anselmo Flood Risk Reduction Project as described in State CEQA *Guidelines* Section 15161. As explained below, although this Project is also part of Phase 1 of the Ross Valley Program, the Project would be constructed regardless of whether and when the Ross Valley Program is implemented. Consistent with State CEQA *Guidelines* Section 15130, Chapter 5 of the EIR analyzes the cumulative effects of implementing the proposed Project along with the Program (as well as other cumulative projects). As explained in Draft EIR Chapter 3, *Project Description,* the Project would substantially reduce the existing levels of flood risk in affected communities regardless of whether the Program is implemented. This EIR is not tiered from the Program EIR, which has not yet been completed, because the Project is scheduled for earlier implementation and, in addition, a greater level of specificity about the Project is available. The San Anselmo Flood Risk Reduction Project has independent utility, as it achieves large reductions in current flood risk, extent, and depth of inundation under a wide range of flood event sizes. It does not require other projects (under the Ross Valley Program or otherwise) to be implemented in order to achieve those benefits. Because of those benefits, the Flood Control District would implement this Project on its own, even without the Ross Valley Program or the other projects within it.

State CEQA *Guidelines* Section 15165 discusses EIRs for multiple projects and phased projects, and states that "[w]here an individual project is a necessary precedent for action on a larger project, or commits the Lead Agency to a larger project, with significant environmental effect, an EIR must address itself to the scope of the larger project. Where one project is one of several similar projects of a public agency, but is not deemed a part of a larger undertaking or a larger project, the agency may prepare one EIR for all projects, or one for each project, but shall in either case comment upon the cumulative effect."

The San Anselmo Flood Risk Reduction Project is neither a necessary precedent for other individual projects under the Ross Valley Program nor an action that would commit the Flood Control District to any of those actions. It is, as the text of Section 15165 describes, one of several similar projects that may be implemented as part of the Ross Valley Program (as noted above and on Draft EIR page 3-4, the Ross Valley Program would also undergo review pursuant to CEQA).

State CEQA *Guidelines* Section 15168 describes a Program EIR and the ways in which such a document "may be" used in cases where a series of actions that can be characterized as one large project and are related either (1) geographically, (2) as parts of a chain of contemplated actions, (3) in connection with rules or regulations for a continuing program, or (4) as individual activities to be carried out under the same authority and with generally similar environmental effects that could be mitigated in similar ways. CEQA Guidelines Section 15168 describes how a Program EIR should be done if one is used, but nothing in the section requires it, as long as the individual projects within a program receive full environmental review as specified under CEQA. Tiering from a Program EIR is an option with several potential advantages, but it is not a requirement.

Therefore, making use of the flexibility allowed by CEQA to choose the type of EIR that will be prepared (see, e.g., State CEQA *Guidelines* Section 15161-15168), the Flood Control District has prepared an individual project-level EIR for this Project. The Program is a reasonably foreseeable cumulative project because planning for the Program and preparation of an EIR for the Program are underway. As discussed in Chapter 5, *Growth and Cumulative Effects*, a reasonably foreseeable project is generally a project for which an application has been filed with the approving agency, for which environmental review is underway, or that has approved funding (CEQA Guidelines Section 15145). The EIR's description of the Program is consistent with CEQA requirements[7] and is, accordingly, treated as a cumulative project in the cumulative impacts analysis in Chapter 5 of the EIR) in compliance with the requirements of State CEQA *Guidelines* Section 15130.

As described in the EIR (e.g., Chapter 3, pages 3-4 through 3-7; Chapter 5, page 5-5), the proposed Ross Valley Program would consist of almost 200 individual projects to be implemented in at least two phases. Phase One, which is anticipated to be constructed during 2017 to 2027, would include use of flood diversion and storage (FDS) basins, bridge replacements and selected elements in the creeks to increase capacity. The San Anselmo Project, the Corte Madera Creek Flood Risk Management Project, and several bridge replacement projects (bridges at Azalea Avenue, Nokomis Avenue, Madrone Avenue, Center Blvd-Sycamore Avenue, and Winship Avenue) are all included in Phase One. Phase Two elements of the Program, to be constructed during 2028 to 2050 after implementation of Phase One, would implement additional creek improvements, bridge

[7] While foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can. However, if after thorough investigation a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate the discussion of the impact (State CEQA *Guidelines* Sections 15144 and 15145).

replacements, additional FDS basins, low impact development, flood preparation and education, and creek maintenance. Draft EIR Section 5.4 (pages 5-8 through 5-31) evaluates the cumulative impacts implementing the Project and Program as well as other cumulative projects identified in Table 5-1 in the EIR. With respect to flood risk, implementation of the Ross Valley Program as well as the Corte Madera Creek Flood Risk Management Project, bridge replacement projects, and other projects in the watershed would have a beneficial effect on cumulative flooding and flood risk within the Ross Valley Watershed (see pages 5-20 and 5-23 of the Draft EIR).

The Project EIR accurately describes the Ross Valley Program as it is conceived at the present time. Several comments suggested that certain FDS basins (e.g., Lefty Gomez, Deer Park) or all of the basins should be excluded from the Program. While these comments do not relate to the environmental effects of the Project, because these FDS basins are not within the scope of the project description analyzed in this EIR, these comments have been noted for the record and have been included in the Final EIR, which will be considered by the decision makers. Some of the details requested by commenters (e.g., grading plans for basin construction and an evaluation of related impacts), are not currently available. Refer to Master Response 3, Future Design Details, for further discussion of the level of design needed to complete impact analyses under CEQA.

One commenter suggests that the Flood Control District address the impacts of implementing the FDS basin proposed as part of the Project with the basins proposed under the Program (the commenter is particularly concerned about increased flooding on his property). Section 5.4 of the EIR presents an analysis of the cumulative impacts of implementation to the degree that such impacts can be described at this time.

Another comment suggests that the EIR inappropriately relies on implementation of the Program and the U.S. Army Corps project (i.e., the Corte Madera Creek Flood Risk Management Project), which the comment says, are not fully defined, in order to mitigate the impacts of the Project. Implementation of the proposed Project and mitigation of the impacts of the Project do not depend on whether the Program and/or the Corte Madera Creek Flood Risk Management Project are implemented. Therefore, the status of the Program or of the Corte Madera Flood Risk Management project do not affect analysis and mitigation of the project-specific impacts identified in this Final EIR. If the Program and/or the Corte Madera Creek Flood Risk Management Project are implemented, however, the cumulative impacts would trend toward reduced flood risk because the combined Program and projects would have greater benefits and more flood risk reduction than any single project.

The analysis of impacts in the Draft EIR does not rely on implementation of other projects to mitigate impacts for the proposed Project. Instead, the project-specific analysis of flood risk (starting on Draft EIR page 4.9-51) identifies project impacts and includes Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, to address these impacts. Under that mitigation measure, the Flood Control District would develop, fund, and implement certain measures on properties where existing habitable structures would experience new inundation in a 25-year event. These measures (described as “flood barriers” in the clarified Mitigation Measure 4.9-4 described in Master Response 6, Changes in Flood Risk and Flood Risk Mitigation) include actions such as berms, flood walls, elevation of structures, wet flood proofing of structures, and dry flood proofing of structures. The Draft EIR concludes that this impact is significant and unavoidable, because the mitigation would require the consent of the owners of private property and is, therefore, outside the control of the Flood Control District.

One comment states that the Project EIR should have tiered from the Ross Valley Program EIR, stating that "the more limited focus on Project-level environmental impacts …undermines this acknowledgement of the need to address Ross Valley flood risks initially at a program level." Tiering under CEQA "refers to the analysis of general matters contained in a broader EIR with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project."[8] CEQA encourages agencies to tier environmental analyses as a means to eliminate repetitive discussions of the same issues and focus the later EIR on the actual issues ripe for decision. But, as discussed in earlier paragraphs of this master response, nothing in CEQA requires preparation of a Program EIR or the subsequent tiering of individual projects from it. Moreover, a project EIR has greater detail and specificity than a program EIR, consistent with the level of detail of the proposed project.

2.2.5 Master Response 5: Flood Modeling

Multiple comments expressed concerns about the flooding model construction, calibration, and reliability, or generally expressed concerns about using a model to assess potential impacts. After an introduction to hydraulic models and associated terminology, this master response discusses the following topics for the Project flood modeling:

- Model construction
- Model calibration and accuracy
- Other modeling concerns (such as sensitivity to channel roughness, the effects of sediment transport on model results, and the areas of the model discussed in the Draft EIR)

2.2.5.1 Introduction to Hydraulic Models

Hydraulic models are computer simulations that represent water flow in the environment using hydraulic theory-based mathematical equations. By mathematically representing a simplified version of a hydraulic system, the effectiveness of flooding counter-measures can be tested and compared. Using hydraulic models to assess potential flooding impacts is a common and standard engineering practice. The applicability or usefulness of any model depends on how closely the mathematical equations approximate the physical system being modeled. Setting up a model involves delineating the model domain (for example, the area within which the model simulates hydraulic conditions), defining the geometry and topography of the system, assigning model parameters that influence how water moves through the domain, and testing, or calibrating and verifying the model output against known information such as measured water surface elevations or high water marks tagged during a historical flood event. During model calibration, model parameters embedded in the mathematical equations are adjusted and the model is rerun

[8] CEQA Guidelines, Section 15152

iteratively until the model output satisfactorily matches the known information. Following calibration, the calibrated model is then used to predict the system behavior for a different set of hydraulic conditions without further changing of the model parameters. If the calibrated model satisfactorily matches the known information, then the model is considered verified.

As noted on Draft EIR page 4.9-39, hydraulic models predict the depth and speed of water that will flow over a given location in a channel or floodplain in response to a given creek flow rate, such as the 100-year flood flow. Hydraulic models can be one-dimensional (1D), two-dimensional (2D), or 1D and 2D combined. In a 1D hydraulic model, the calculations are made at a series of surveyed cross sections across the channel and floodplain.[9] Cross sections are typically spaced every few hundred feet. In a 2D model, the calculations are made at grid cells throughout the channel and floodplain. A 1D model is very good at estimating the flow at which a channel will overtop and cause flooding, but less so at predicting where water will go once it escapes into the floodplain. For that reason, a 2D model is used for the floodplain area to better predict where flow will go once it escapes from the channel. In a combined 1D channel and 2D floodplain model, the calculations are designed to take advantage of the respective strengths of the 1D and 2D models. Areas included in the models are called Flow Areas. The combined 1D channel and 2D floodplain model simulates the flow exchanges (e.g., overtopping flows, return flows) between the channel Flow Areas and the floodplain Flow Areas along the tops of channel banks.

With regard to flow variability with time, hydraulic models can be either steady-flow or unsteady-flow (or dynamic) models. Steady-flow models run at a constant flow (e.g. the peak of the 100-year flow) and solve the mathematical equations over space only, without considering flow variations over time. Unsteady-flow models run the entire hydrograph with its rising, peak, and falling stages and solve the mathematical equations with consideration of flow variations over both space and time. Steady-flow models are generally more conservative than unsteady-flow models in that they predict larger areas of flooding because they assume that all parts of the creek and floodplain are receiving the peak flow simultaneously and continuously over an infinite amount of time, and flood attenuation is not considered.

2.2.5.2 Corte Madera Creek 1D/2D Unsteady-Flow Model Construction

For purposes of the EIR analysis, hydraulic modeling was performed to assess the Project's effects with regard to flooding. U.S. Army Corps of Engineers (USACE) software, HEC-RAS[10] version 5.0, was used for modeling because it has combined 1D/2D and unsteady flow hydraulic capabilities. A combined 1D/2D unsteady-flow model application of HEC-RAS version 5.0 for the Corte Madera Creek watershed was jointly developed in 2017 by Stetson Engineers and USACE.[11] The model starts at the San Francisco Bay and extends about 10 miles upstream along the mainstream and tributaries into the upper watershed upstream of Fairfax. The model geometry incorporates sedimentation depths measured in May 2015 at the lower portion of the Corte Madera

9 The portion of the cross section in the floodplain is typically based on LiDAR topography.

10 The full name of the HEC-RAS model is "**H**ydrologic **E**ngineering **C**enter – **R**iver **A**nalysis **S**ystem".

11 USACE developed the lower portion of the model which starts immediately downstream of the Ross Creek confluence with Corte Madera Creek and extends downstream to the bay encompassing the USACE Corte Madera Creek Project. Stetson Engineers developed the upper portion of the model and merged the two model portions to arrive at a single, comprehensive Ross Valley hydraulic model covering the entire Corte Madera Creek/San Anselmo Creek mainstem and major tributaries. Stetson Engineers then calibrated and verified the merged model.

Creek concrete channel.[12] The model was calibrated to the 12/15/2016 bankfull event and the 12/31/2005 flood event (an approximate 100-year flood), and verified to the 1/4/1982 flood event (an approximate 150-year flood). The model was peer-reviewed by USACE modeling experts.

The remainder of this section provides an overview of the model construction.

1D/2D Modeled Areas Configuration. In general, the 2D Flow Areas cover most of the floodplain and the 1D Flow Areas cover the channel of the entire Corte Madera Creek/San Anselmo Creek mainstem and major tributaries. The lateral extents of the 2D Flow Areas encompass the approximate 500-year flood inundation area as indicated in the Federal Emergency Management Agency's (FEMA's) 2014 Flood Insurance Rate Maps (FIRMs), Stetson Engineer's MIKE FLOOD floodplain maps contained in the 2011 Ross Valley Capital Improvement Plan (CIP) study, and as inferred by the locations of the High Water Marks (HWMs) for the 1982 and 2005 floods. Non-flood-prone areas adjacent to the channel and some areas of the floodplain where minor or localized flooding occurs, but where the detail provided by 2D simulation is not needed, were also identified as 1D Flow Areas in order to minimize model computational time and avoid unnecessary model development effort. To allow flow exchange between 1D channel and 2D Flow Areas, lateral links were placed along the tops of the channel banks.

1D Cross-Sections. The 1D cross-sections were derived from the existing Ross Valley HEC-RAS 1D steady-flow hydraulic model that was developed by Stetson Engineers in 2011 for the Ross Valley CIP Study. The 1D channel cross-section geometry data were collected from field surveys performed in 2004 – 2009 for natural channels and the Corps' as-built designs for the concrete channel.

Terrain.[13] The terrain used in the hydraulic model was derived from two sources. The channel cross-section area was derived from the existing Ross Valley HEC-RAS 1D steady-flow hydraulic model. The overbank area terrain was derived from the 2010 LiDAR survey point data provided by Marin County. A GIS Triangulated Irregular Network surface was created from the two data sources, which was then converted to a Digital Elevation Model to be used by RASMapper in HEC-RAS to create a terrain surface for the hydraulic model.

2D Grid Cell Size. The primary grid cell size for the 2D Flow Areas is 10 feet by 10 feet in the upper portion of the model (upstream of the Ross Creek confluence) and 20 feet by 20 feet in the lower portion of the model (downstream of the Ross Creek confluence). Additional effort was

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[12] Sediment had deposited in the lower portion of the concrete channel. The channel geometry of the model incorporated the 2015 sediment depth measured along the lower portion of the concrete channel as the bottom of the channel, rather than using the as-built designs of the clean concrete channel. Using the 2015 measured sediment depth has no relation to the calibration to the specific events. Actually the sediment depth that occurred during the specific event was likely mobilized but not measured. Due to modifications in recent years of a few hydraulic structures along Corte Madera Creek, including replacement of Lagunitas Bridge in 2010, modification of the Ross Fish Ladder in 2006, and the replacement of the Creekside Marsh culvert near Bon Air road in 2016, two geometry files were developed for model calibration; "2005 geometry" and "2017 geometry." Both geometries share exactly the same calibrated/verified hydraulic parameters, and differ only with regard to the geometries of these three structures. For the design and analyses of alternatives, only the "2017 geometry" file was used.

[13] Terrain or topographical relief refers to the vertical and horizontal dimensions of land surface and is usually expressed in terms of the elevation, slope, and orientation of terrain features. Terrain affects surface water flow and distribution.

made to enhance the topography representation at key locations (e.g., top of bank areas, berms, roads) using break lines (see additional description of break lines below) and fine mesh size of 2 feet by 2 feet. The topographic resolution is sufficient to capture topography of streets and most flow barriers such as berms or other high ground features. The effects of building structures were represented in the model by using a very high Manning's n roughness[14] for grid cells where structures are located (see additional description of Manning's n below) to allow floodwater to enter buildings but at very slow speed. Fences were excluded from the model since fences are not expected to have an important effect on blocking or redirecting flows during the flood events modeled. This is because the fences are often not impermeable or are not typically designed to withstand floodwaters and, as such, can be easily pushed over during floods.

Break Lines.[15] Break lines are included in the 2D computational mesh in order to align the cell edges with high ground. Aligning the cell edges with high ground ensures that barriers to flow, such as berms or roads, are correctly represented in the computational mesh. Without break lines, flow may cross a high ground barrier prematurely.

Manning's n Values. Manning's n values are used to account for the resistance to flow exerted by the ground surface or other surface (e.g., vegetation) that the flowing water is exposed to. A greater n value indicates greater surface roughness and resistance to flow. The n values for the 1D channel were initially based on the existing Ross Valley HEC-RAS 1D steady-state hydraulic model. The n values for the 2D Flow Areas were initially based on land cover data (i.e., parcels, buildings, streets, parking lots, etc.) and the HEC-RAS version 5 User's Manual (USACE, 2016). These initial Manning's n values were then modified as needed to reflect observed hydraulic conditions during calibration of the combined 1D/2D model.

Bridges/Culverts/Building Structures and Modeling Method. The model represents all structures (except the most downstream Highway 101 Bridge, which does not obstruct flows during up to the 500-year flood event due to its elevation above the channel) crossing the modeled creek channels including 34 bridges, 7 building bridges, and 4 culverts. Most of the bridges are modeled using the "Energy-Based" method, and some are modeled using the "Pressure and/or Weir Flow" method[16].

14 Another way to represent building structures in a 2D model is to set high ground surface elevations for building footprints. This representation would cause buildings to act like flow barriers -- no floodwater would enter buildings. This representation was not used because it would not account for the volume of floodwater that enters buildings and would create dry areas in building footprints which is not realistic.

15 Break lines are used to define features such as berms, roads, channel top of bank areas, and other high ground features. Break lines force surface triangulation along the break line preventing triangulation across the break line when developing the topographic Digital Elevation Model.

16 The HEC-RAS program has the ability to compute high flows (flows that come into contact with the maximum low chord of the bridge deck) by either the Energy equation or by using separate hydraulic equations for pressure and/or weir flow. The energy-based method is applied to high flows in the same manner as it is applied to low flows. Computations of the energy-based method are based on balancing the energy equation through the bridge. Energy losses are based on friction and contraction/expansion losses. The energy-based method is commonly used for the conditions when the bridge deck is a small obstruction to the flow and the bridge opening is not acting like a pressurized orifice, or the bridge is highly submerged. The pressure and/or weir flow method is commonly used for the conditions when the bridge deck is a large obstruction to the flow and a backwater is created due to the constriction of the flow, or the bridge is overtopped but is not highly submerged by the downstream tailwater.

Boundary Conditions. The upstream boundaries are located at the upstream ends of the main channel and tributaries of the model. The upstream boundary conditions are the inflow hydrographs during the selected flood event. There are a total of 27 inflow locations in the model, including point source inflows at the upper boundaries and point source lateral inflows and uniform lateral inflows along the reaches. The downstream boundary was set as the observed time-varying San Francisco Bay tide for the model calibration/verification events, and constant mean higher high water (MHHW) for the design and analyses of alternatives.

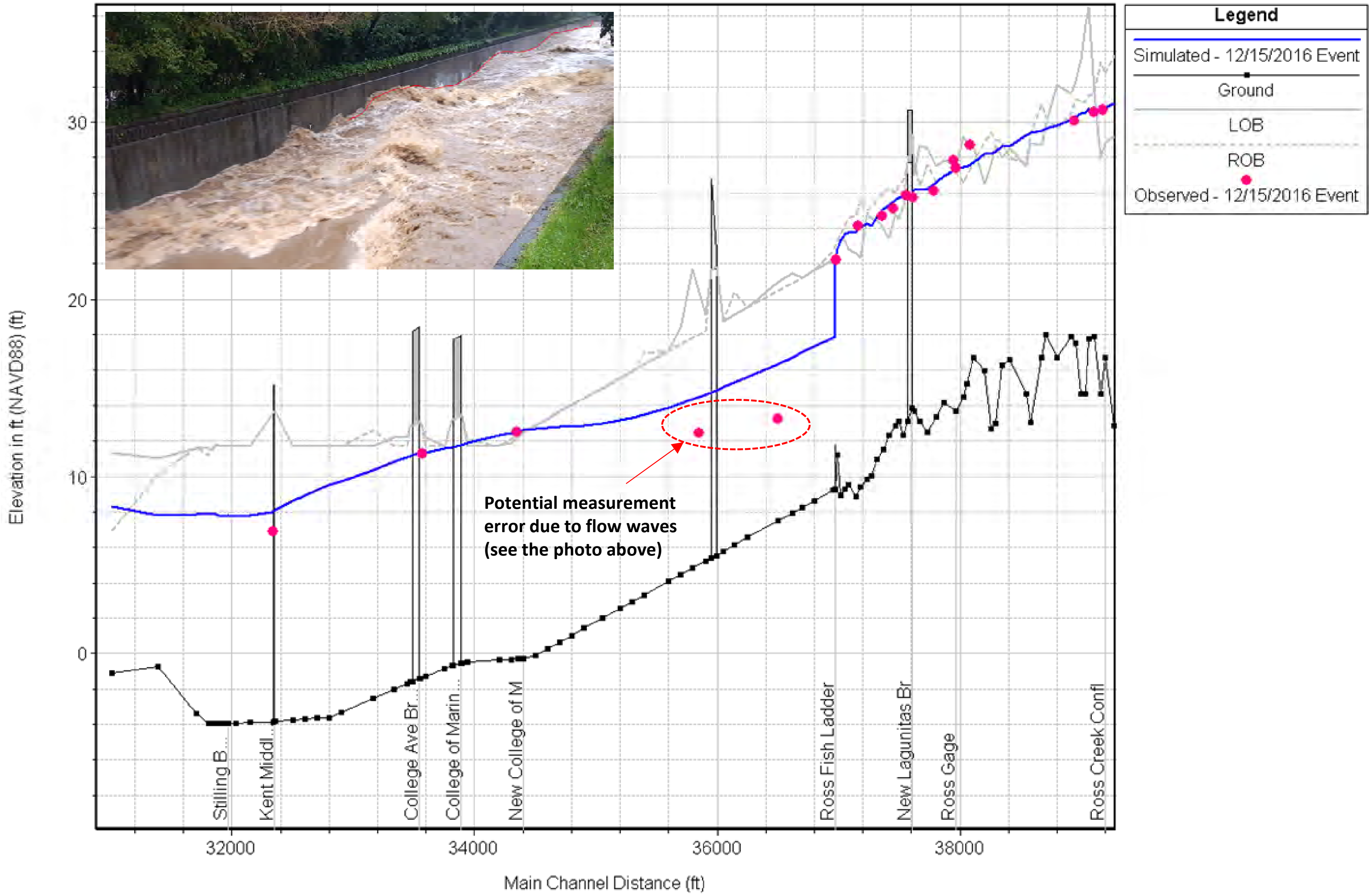
2.2.5.3 Model Calibration and Accuracy

As described on Draft EIR page 4.9-39, the model was calibrated to one historical top of bank event[17] (on December 15, 2016) and one historical approximately 100-year flood (on December 31, 2005) on Corte Madera Creek. The model was validated based on the January 4, 1982 flood event (an approximate 150-year flood event).

The model was first calibrated to the 12/15/2016 bankfull event by running and rerunning the model and adjusting the model's in-channel parameters with each iteration until the model-simulated peak water surface elevations satisfactorily matched the observed channel HWMs (refer to **Figures RTC 2-1 through 2-4** for the model calibration results). The model was then calibrated to the 12/31/2005 flood event by further adjusting the floodplain parameters until the model-simulated peak water surface elevations in the floodplain satisfactorily matched the observed floodplain HWMs. The model was finally verified to the 1/4/1982 flood event. For all the three events, simulation differences were well within the FEMA-required 0.5-foot range for most of the HWMs, particularly at locations where HWMs were considered most reliable.

All hydraulic models solve universally-accepted mathematical equations to simulate surface water movement across approximated topographic terrain. The solutions are approximations because a model cannot precisely quantify the spatially variable properties that exist in the real world. A reliable hydraulic model is one that can produce field-measured water levels and flow within an acceptable range of error. Error exists because information on the real world system is always incomplete, and the field information that is available has associated errors (for example, measurement error). For all the three model calibration/verification events, the differences between the model-simulated peak water surface elevations and the observed HWMs were well within the FEMA-required 0.5-foot range for most of the HWMs, particularly at locations where HWMs were considered most reliable.

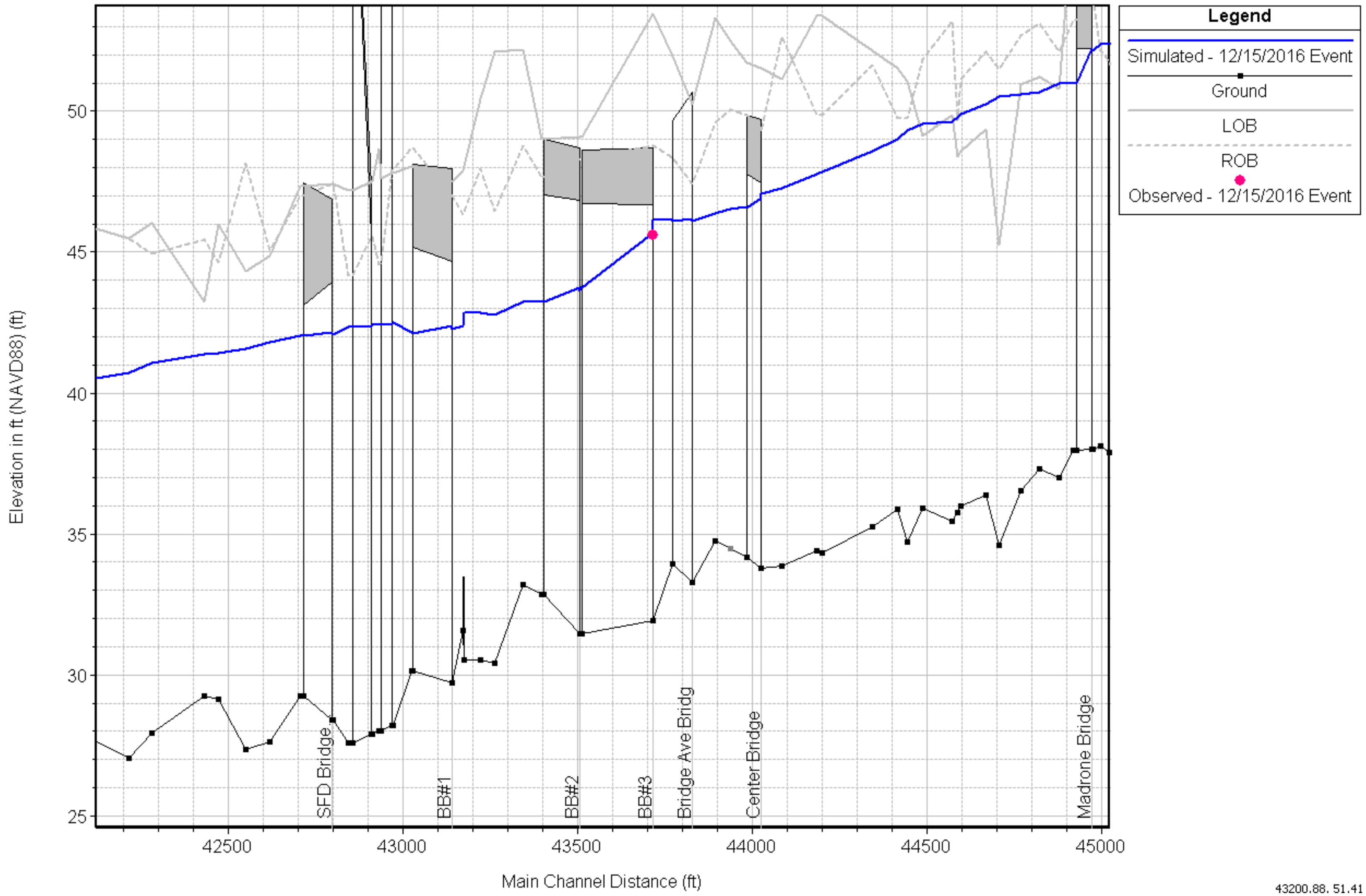
17 Top of bank event means the maximum volumetric flow rate of water that a stream channel can carry without overflowing, also called "bankfull" event.



SOURCE: Stetson Engineers

San Anselmo Flood Risk Reduction Project

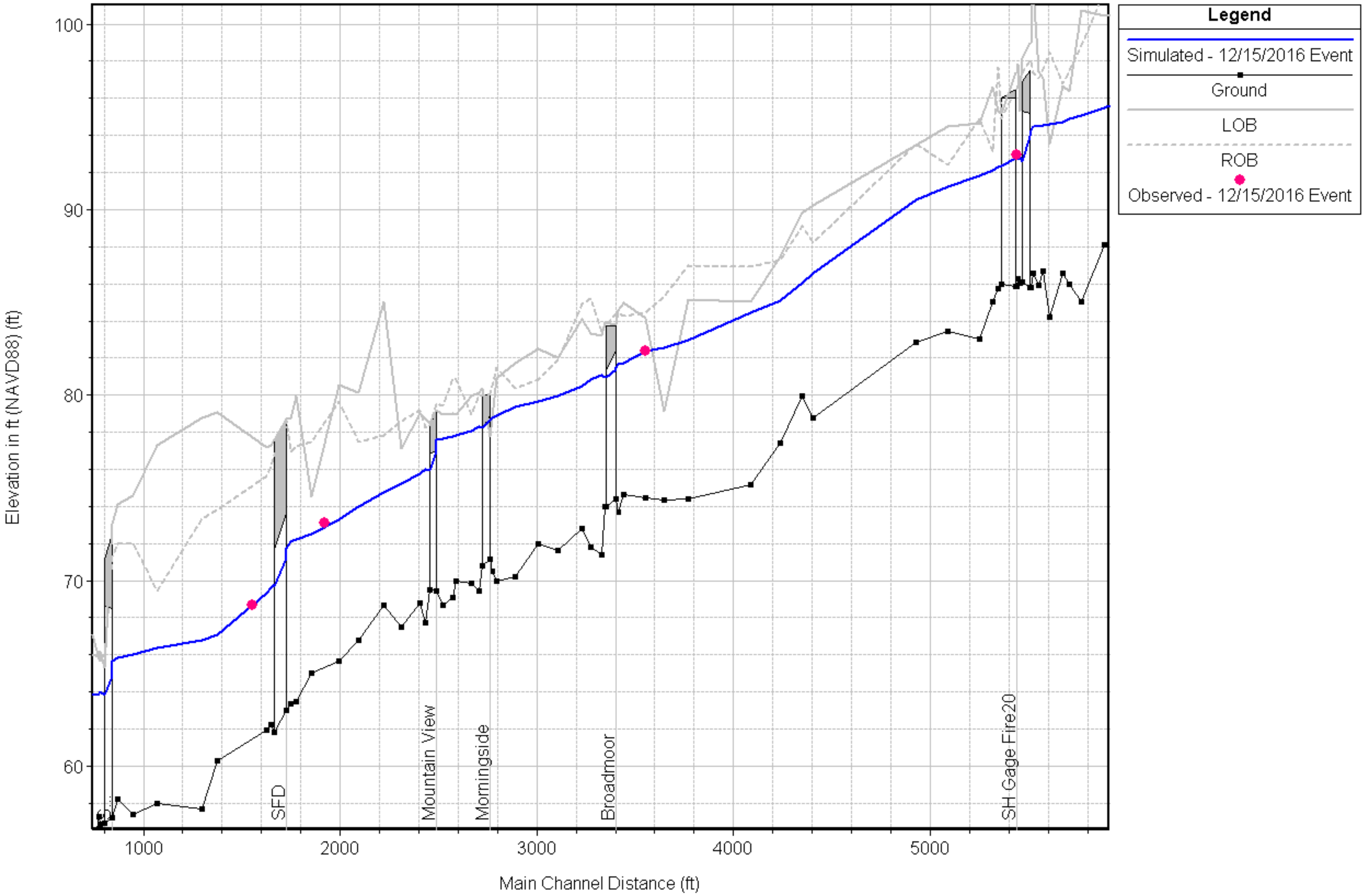
Figure RTC 2-1
Comparison of HEC-RAS Simulated Peak Water Surface Elevation (WSE) versus Observed High Water Marks (HWMs) for 12/15/2016 Flow Event – Corte Madera Creek (Units 2-4)



SOURCE: Stetson Engineers

San Anselmo Flood Risk Reduction Project

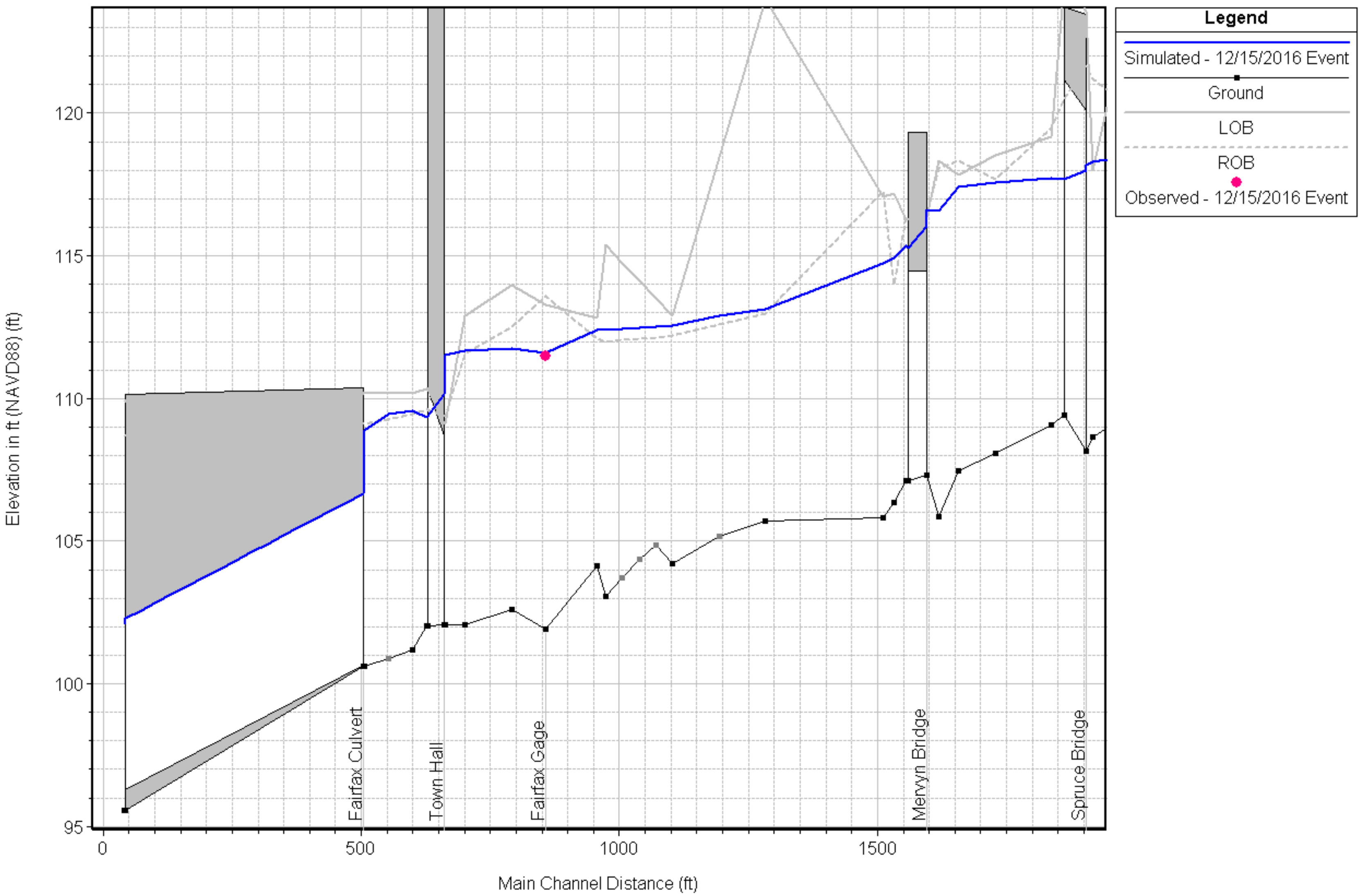
Figure RTC 2-2
Comparison of HEC-RAS Simulated Peak Water Surface Elevation (WSE) versus Observed High Water Marks (HWMs) for 12/15/2016 Flow Event – San Anselmo Creek



SOURCE: Stetson Engineers

San Anselmo Flood Risk Reduction Project

Figure RTC 2-3
Comparison of HEC-RAS Simulated Peak Water Surface Elevation (WSE) versus Observed High Water Marks (HWMs) for 12/15/2016 Flow Event – Sleepy Hollow Creek



SOURCE: Stetson Engineers

San Anselmo Flood Risk Reduction Project

Figure RTC 2-4
Comparison of HEC-RAS Simulated Peak Water Surface Elevation (WSE) versus Observed High Water Marks (HWMs) for 12/15/2016 Flow Event – Fairfax Creek

2.2.5.4 Discussions of Several Other Modeling-Related Questions

Sensitivity to Channel Roughness

The hydraulic model is sensitive to channel roughness (i.e., Manning's n). The final channel Manning's n used in the model was determined through the in-channel model calibration to the observed hydrographs and high water marks from the 12/15/2016 bankfull event. During the model calibration, Manning's n was adjusted within literature-recommended ranges for the specific channel conditions (e.g., vegetation, channel irregularity, channel alignment, smoothness of channel bed), until the model simulated WSEs were equal or within the acceptable range (0.5 foot in general) to the observed WSEs. The model calibration ensured the model to be able to accurately simulate the project scenarios.

Effect of Sediment Transport in Flood Modeling

Sediment transport in flood water may affect the resistance to flow (i.e., Manning's n roughness) and, in turn, the water surface. More sediment and/or larger sediment particles may mean more resistance to flow and higher water surface. Since Manning's n was calibrated/verified to the actual HWMs observed during different flow events, the effect of sediment transport was already reflected in the flood modeling by means of the calibrated/verified Manning's n.

Modeling Results Downstream of the Sir Francis Drake Bridge (D/S Crossing)

While the flood model includes the entire Ross Valley watershed, the Draft EIR discussion of flood model results is limited to areas where Project impacts could occur. As noted in the Draft EIR page 4.9-59, the San Anselmo Creek channel capacity gets much larger immediately downstream of the Sir Francis Drake Bridge (D/S crossing), large enough that the Project does not affect water surface elevation downstream of the Sir Francis Drake Bridge during the flood events modeled. Regarding the request that areas downstream of Lagunitas Bridge be discussed in the Draft EIR, these areas were not included in the project-level impact analysis because the Project would not affect water surface elevations there. Draft EIR Chapter 5 evaluates cumulative impacts of the Project along with other reasonably foreseeable projects, including flooding impacts.

2.2.6 Master Response 6: Changes in Flood Risk and Flood Risk Mitigation

Multiple commenters requested more specific information about changes in flood risk and design of mitigation measures upstream of the Nursery Basin site and downstream of the building at 634-636 San Anselmo Avenue. This master response addresses the following topics in the subsections below.

- Concern about changes in flood risk resulting from the project
- The number and locations of properties affected by this increased flood risk
- Selection of flood risk significance threshold

- Flood risk mitigation
- Design details of the mitigation measure
- Environmental impacts of mitigation measures
- Significant and Unavoidable Impacts and Statement of Overriding Considerations

Changes in Flood Risk

Impacts resulting from changes in flood risk associated with the project are evaluated in Draft EIR Section 4.9, Hydrology and Water Quality, and Chapter 5, *Growth-Inducing and Cumulative Effects*. The Draft EIR analysis relies upon modeled water surface elevations and extent of flooding, and conservatively assumes that any locations where small amounts of new inundation or increases in water surface elevation could occur outside the creek channel could experience increased flood risk. As discussed in Draft EIR Section 4.9.3.2, the impact was considered significant if the project would exacerbate existing or future flood hazards or increase the frequency or severity of flooding in such a way as to substantially increase the threat to life and/or property.

An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision that intelligently that takes account of environmental consequences.[18] The flood modeling analysis conducted for the Draft EIR analyzed a range of events of differing magnitude (10-, 25- and 100-year events), selected to fully capture the potential effects of the project, and identifies areas where flood risk would decrease or increase. The Draft EIR discusses these effects in Impact 4.9-4 and in Chapter 5 (identifying the project-specific and cumulative impacts, respectively). Draft EIR Table 4.9-3 summarizes the changes in flood risk for the range of flood events, and Draft EIR Figures 3-13a through 3-15c illustrate these changes.

Some commenters asked why the flood modeling to evaluate this risk was done for the 25-year event but not for the 100-year event. The perception or interpretation behind these questions is not correct. As explained above, the modeling was performed for the 10-year, 25-year, and 100-year events, but the most meaningful results were those for the 25-year event, which was why more of the discussion in the document addressed that event. As explained in Draft EIR Section 3.4.2.3 and Section 4.9.3, the San Anselmo Flood Risk Reduction Project would have the greatest benefit by reducing the impacts associated with smaller, more frequent events, such as the 10-year flood event. Modeling for a 25-year event shows reductions in flood risk on 635 parcels, and increases in flood risk on 19 parcels.[19] Accordingly, the 25-year flood event was determined to be a reasonable and conservative measure of the potentially significant adverse environmental effects of the project related to increased flood risk. By contrast, larger events, such as the 100-year flood event, would not be fully contained by the project improvements, and improvements in flood risk would be reduced compared with the 10-year and 25-year events. As explained on Draft EIR page 4.9-55, during the 100-year event, floodplain inundation in Fairfax, San Anselmo, and Ross would not occur in any areas not already inundated during the 100-year

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[18] State CEQA *Guidelines* 15151.

[19] As discussed in greater detail in the following section, 18 of these parcels are mapped within the FEMA 100-year floodplain (i.e., the parcels are flooded during the 100-year flood event under existing conditions).

flood event (generally considered to be the "known floodplain" pursuant to National Flood Insurance Program). For this reason, it is a more conservative choice to use a smaller flood event (such as the 25-year event) to evaluate changes in flood risk; however, the results of all three event sizes are included in Draft EIR Section 4.9, Hydrology and Water Quality (text on Impact 4.9-4) and Appendix D.

The modeling indicates that two different types of impacts related to flood risk are possible. The first type is flooding upstream of the Nursery Basin site. This could occur because the diversion structure that would be placed in Fairfax Creek would cause water to pool in the creek channel and deposit sediment there. As described on Draft EIR page 4.9-52, if sediment deposited upstream of the diversion structure is not removed before the next large event (the worst-case scenario in terms of changing inundation patterns upstream of the diversion structure), the project could increase peak channel water surface elevations. Upstream of Flood Control District property, peak channel water surface elevations could increase by up to 3.8 feet during the 25-year flood event. Table RTC 3-1 in Response C21-8 provides additional detail regarding the changes in modeled water surface elevations in this area. The existing 100-year flood water surface elevation in the Fairfax Creek channel upstream of Flood Control District property ranges from 233.5 to 238.5 feet NAVD88. The peak water surface elevation upstream of Flood Control District property during the 100-year flood event with the diversion structure and sediment deposition would be up to 3.6 feet higher than the existing 100-year flood event water surface elevation. At these elevations, new inundation outside of the creek channel could occur on a portion of one parcel in an area of low channel banks upstream of the Sunnyside Bridge, as shown on **Figure RTC 2-5** (also added to Appendix D, item D-5).[20] Increased water surface elevations would also reduce the gravity draining capacity of the storm drain during flood events and could cause a backwater effect in the storm drain and localized ponding of floodwater around the storm drain inlet located at the end of Deer Creek Court cul-de-sac. As discussed on Draft EIR page 3-42, the project design would include a valve or weir in the storm drain that would route stormwater around basin to eliminate the potential for ponding.

As described in Draft EIR Impact 4.9-4, while annual sediment removal proposed as part of the Project would reduce the volume of sediment accumulated behind the diversion structure, a single event could produce enough sediment to cause new inundation during that same event; therefore, the Project's impact on upstream flooding would remain significant. In addition to the planned sediment removal (discussed in text beginning on page 4.9-42 of the Draft EIR and as further explained in Master Response 7, Erosion, Sedimentation, and Channel Maintenance), Draft EIR Mitigation Measure 4.9-3a, Prioritize Nursery Basin Reach for Stream Maintenance, is proposed to reduce this risk by prioritizing sediment removal from this section of Fairfax Creek for regular removal under the Flood Control District's Stream Maintenance Program. Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Properties, is proposed to address this potential upstream (i.e., backwater) flooding by implementing flood barriers.

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20 As discussed in greater detail in Master Response 7, the Draft EIR impact analysis conservatively relied upon a high sediment production rate from a nearby watershed (Devil's Gulch watershed) for which sediment production rates during a large storm event are known. Sediment production estimates based on measurements from other nearby watersheds, combined with known stream power information for Fairfax Creek, result in a much lower production rate than the estimate used for the impact analysis (about 30 cubic yards as compared to 2,900 cubic yards for Devil's Gulch during the 25-year flood event).

The second type of new or increased flooding anticipated would occur in areas downstream of where the building at 634-636 San Anselmo Avenue would be removed. As discussed starting on Draft EIR page 4.9-52, Project operation would reduce flood risk in Fairfax, San Anselmo, and Ross on between 480 and 635 parcels (depending on the magnitude of the flood event), and would increase downstream flood risk on up to 17 parcels between Barber Avenue and the Sir Francis Drake Bridge during the 25-year flood event. As discussed in Draft EIR Impact 4.9-4, the FDS basin would retain stormwater that currently floods Fairfax and San Anselmo, reducing the volume of water that floods downstream into lower neighborhoods. Removal of 634-636 San Anselmo Avenue would allow water to remain in the channel; this would raise the water surface elevation of water pooling upstream of Winship Avenue, where the Winship Bridge currently constricts wet weather flows.

Identification of Properties with Increased Flood Risk

Several comment letters requested that the EIR identify the specific properties affected, by street address. **Tables RTC 2-1 and RTC 2-2** identify properties that the hydraulic modeling of the 25-year flood event and the 100-year event indicated would potentially be impacted by project implementation. In Table RTC 2-1, "Increased Depth" means that the model results indicate that a portion of the property would flood during a 25-year flood event under existing conditions, but that it would experience a greater depth of inundation after the project is implemented. "New Inundation" means that modeling shows the property would not be affected by flooding during a 25-year flood event under existing conditions but that it would be affected if the Project were implemented. In Table RTC 2-2, "Increased Inundation" means that the parcel would experience flooding during the 100-year event under existing conditions but that the depth or extent of expected inundation would increase after project implementation. The right-most column of each table indicates whether that parcel is currently in a FEMA Special Flood Hazard Area (SFHA) and whether or not the primary structure on that parcel is in the FEMA SFHA. This designation is based on FEMA mapping and is not a result modeling performed for this project or related to project effects.

Flood Risk Significance Threshold

Several comments questioned the "habitable structure standard" for what is considered a substantial effect on life or property. The National Flood Insurance Program (NFIP) regulations generally require elevation or protection of the lowest floor of a building from the 100-year flood event. The "lowest floor" means the lowest floor of the lowest enclosed area, including a basement. However, "[a]n unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of section 60.3."[21] This threshold is also consistent with State CEQA *Guidelines* Section 15064.7(a).

[21] 44 Code of Federal Regulations (CFR) 59.1.

SOURCE: Stetson Engineers

Figure RTC 2-5
Inundation Area at Nursery Basin Site

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TABLE RTC 2-1
PROPERTIES POTENTIALLY IMPACTED BY FLOODING IN THE 25-YEAR EVENT

Zoning	Address	APN	Town	Type of Impact	Parcel / Primary Structure in FEMA SFHZ?
Single-Family Residential	100 Sir Francis Drake Blvd.	072-151-08	Ross	Increased Depth / New Inundation	Yes / No
Single-Family Residential	98 Sir Francis Drake Blvd.	072-151-07	Ross	New Inundation	Yes / Yes
Single-Family Residential	96 Sir Francis Drake Blvd.	072-151-03	Ross	New Inundation	Yes / Yes
Single-Family Residential	94 Sir Francis Drake Blvd.	072-151-04	Ross	New Inundation	Yes / Yes
Single-Family Residential	92 Sir Francis Drake Blvd.	072-151-05	Ross	New Inundation	Yes / Yes
Single-Family Residential	90 Sir Francis Drake Blvd.	072-151-06	Ross	New Inundation	Yes / Yes
Single-Family Residential	86 Sir Francis Drake Blvd.	072-161-01	Ross	New Inundation	Yes / Yes
Single-Family Residential	84 Sir Francis Drake Blvd.	072-161-13	Ross	Increased Depth	Yes / Yes
Single-Family Residential	82 Sir Francis Drake Blvd.	072-161-12	Ross	Increased Depth	Yes / Yes
Single-Family Residential	78 Sir Francis Drake Blvd.	072-161-11	Ross	Increased Depth	Yes / Yes
Single-Family Residential	74 Sir Francis Drake Blvd.	072-161-10	Ross	Increased Depth / New Inundation	Yes / Yes
Single-Family Residential	40 Sir Francis Drake Blvd.	006-191-20	San Anselmo	Increased Depth	Yes / Yes
Single-Family Residential	36 Sir Francis Drake Blvd.	006-191-19	San Anselmo	Increased Depth	Yes / Yes
Single-Family Residential	34 Sir Francis Drake Blvd.	006-191-18	San Anselmo	Increased Depth / New Inundation	Yes / No
Multiple-Family Residential	32 Sir Francis Drake Blvd.	006-191-17	San Anselmo	Increased Depth	Yes / Yes
Single-Family Residential (unimproved)	30 Sir Francis Drake Blvd.	006-191-39	San Anselmo	Increased Depth	Yes / No
Single-Family Residential	28 Sir Francis Drake Blvd.	006-191-16	San Anselmo	Increased Depth / New Inundation	Yes / Yes
Single-Family Residential	16 Deer Creek Court [a]	174-180-09	Fairfax	New Inundation	No / No

NOTES: [a] This address is upstream of the Nursery Basin site; would be affected by backwater flooding of the first type discussed in this response.

SOURCE: Stetson Engineers, San Anselmo Flood Risk Reduction Project CEQA Support Conceptual Designs and Supplemental Modeling of Option 2A for Different Layouts of Sunnyside Detention Basin, January 31, 2018; Stetson Engineers, Water Depth Change point GIS data for D30, D31, D33, December 12, 2017.

TABLE RTC 2-2
PROPERTIES POTENTIALLY IMPACTED BY FLOODING IN THE 100-YEAR EVENT

Zoning	Address	APN	Town	Type of Impact	Parcel / Primary Structure in FEMA SFHZ?
Single-Family Residential	100 Sir Francis Drake Blvd.	072-151-08	Ross	Increased Inundation	Yes / No
Single-Family Residential	98 Sir Francis Drake Blvd.	072-151-07	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	96 Sir Francis Drake Blvd.	072-151-03	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	94 Sir Francis Drake Blvd.	072-151-04	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	92 Sir Francis Drake Blvd.	072-151-05	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	90 Sir Francis Drake Blvd.	072-151-06	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	86 Sir Francis Drake Blvd.	072-161-01	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	84 Sir Francis Drake Blvd.	072-161-13	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	82 Sir Francis Drake Blvd.	072-161-12	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	78 Sir Francis Drake Blvd.	072-161-11	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	74 Sir Francis Drake Blvd.	072-161-10	Ross	Increased Inundation	Yes / Yes
Single-Family Residential	54 Sir Francis Drake Blvd.	006-191-21	San Anselmo	Increased Inundation	Yes / Yes
Single-Family Residential	40 Sir Francis Drake Blvd.	006-191-20	San Anselmo	Increased Inundation	Yes / Yes
Single-Family Residential	36 Sir Francis Drake Blvd.	006-191-19	San Anselmo	Increased Inundation	Yes / No
Single-Family Residential	34 Sir Francis Drake Blvd.	006-191-18	San Anselmo	Increased Inundation	Yes / No
Multiple-Family Residential	32 Sir Francis Drake Blvd.	006-191-17	San Anselmo	Increased Inundation	Yes / Yes
Single-Family Residential (unimproved)	30 Sir Francis Drake Blvd.	006-191-39	San Anselmo	Increased Inundation	Yes / No
Single-Family Residential	28 Sir Francis Drake Blvd.	006-191-16	San Anselmo	Increased Inundation	Yes / Yes
Single-Family Residential	16 Deer Creek Court [a]	174-180-09	Fairfax	New Inundation	No / No

NOTES: [a] This address is upstream of the Nursery Basin site; would be affected by backwater flooding of the first type discussed in this response.

SOURCE: Stetson Engineers, San Anselmo Flood Risk Reduction Project CEQA Support Conceptual Designs and Supplemental Modeling of Option 2A for Different Layouts of Sunnyside Detention Basin, January 31, 2018; Stetson Engineers, Water Depth Change point GIS data for D30, D31, D33, December 12, 2017.

For purposes of the Draft EIR, the NFIP regulations were used to select the appropriate threshold defining where the impacts of increased flood risk would be significant (that is, to identify which types of existing structures should be protected from project-related increased flood risk). To clarify, the Flood Control District intends for the "first finished floor" identified in Draft EIR Impact 4.9-4 (page 4.9-56) to be the same as the "lowest floor" as defined in the NFIP. As noted in Table RTC 2-1 and Table RTC 2-2, above, all of the parcels and many of the primary structures on them are already in the SFHA addressed by the NFIP.

Flood Risk Mitigation

Commenters suggested additional measures to address downstream flooding impact or requested that the EIR more specifically describe the types and extent of those measures. Other comments either explicitly or implicitly equated the Draft EIR's use of the term "flood barrier" with "flood wall." The Draft EIR uses the term "flood barrier" as a general, categorical term for a broader range measures to reduce flooding or flood-related impacts on relatively small areas, such as an individual structure or parcel of land. This approach is used by FEMA[22] and the U.S. Army Corps of Engineers[23], which treat measures such as berms, flood walls, raising individual structures, wet-proofing or dry-proofing of structures, and others are part of a broad category of flood mitigation measures that in this EIR are referred to as "flood barriers." The Flood Control District has clarified that Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, may include multiple options to mitigate the flooding impacts of the project. These options include methods and techniques implemented for reducing flood risk and/or flood damages by adapting to the natural characteristics of flooding within the unobstructed floodplain. These are measures used to mitigate potential loss of life as well as property damage. As noted in clarified Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, these measures would be required to protect existing habitable structures on affected parcels from new inundation during the 25-year event, which is the same performance standard as applied to the flood barriers specified in the Draft EIR.

Mitigation Measure 4.9-4: Provide Flood Protection to Substantially Affected Areas

For areas upstream and downstream of the Winship Bridge (between Barber Avenue and the Sir Francis Drake Bridge): ~~If the Winship Bridge Replacement Project is not completed prior to construction of the Project, t~~The Flood Control District shall develop~~,~~ ~~fund,~~ and implement flood barriers on properties where existing habitable structures would experience new inundation in a 25-year event. The flood barriers shall be designed based on hydraulic modeling demonstrating that the flood barriers would protect existing habitable structures on any properties upstream of the Sir Francis Drake Bridge from new inundation during the 25-year event~~.~~ or to any higher degree of protection required for that particular type of measure by applicable building codes. Flood barriers include but are not limited to the following measures:

- Elevation of structures above the 100-year flood elevations

[22] FEMA, Chapter 3, An Overview of the Retrofitting Methods, in *FEMA P-312, Homeowner's Guide to Retrofitting*, Third Edition, 2014. Available online at https://www.fema.gov/media-library/assets/documents/480, accessed August 17, 2018.

[23] U.S. Army Corps of Engineers Nonstructural Flood Proofing Committee and Association of State Floodplain Managers, Nonstructural Flood Risk Management, undated.

- Basement removal and construction of an addition to contain utilities removed from the basement
- Wet flood proofing of structures, in which, with use of water resistant materials, floodwaters are allowed to enter a structure during a flood event
- Dry flood proofing of structures
- Berms or flood walls

***For areas immediately upstream of the Nursery Basin site*:** The Flood Control District shall develop~~, fund,~~ and implement flood barriers on properties where existing habitable structures would experience new inundation in a 25-year event.

***For both of those locations*:** The flood barriers would ensure that existing habitable structures would not be inundated by the 25-year event. Upon confirmation of permission by the property owners, the Flood Control District shall implement this measure, including implementing any measures identified in permits required from the California Department of Fish and Wildlife, Regional Water Quality Control Board, or other regulatory agencies. However, the potentially adversely affected parcels are privately owned, and the Flood Control District ~~cannot necessarily~~ is not proposing to require the installation or implementation of flood barriers ~~because~~ without the consent of the property owner(s), who may ~~specifically~~ request that such measures not be implemented. In that case, this Mitigation Measure ~~shall~~ would not be implemented, and the affected parcels may experience an increased level of flood inundation in a 25-year event or larger.

The degree of flood protection provided to an individual property will vary depending on the specifics of the flood barrier selected. For most of the flood barriers, the Flood Control District shall provide protection from the 25-year event. However, pursuant to Marin County building code and associated permitting requirements, any increase in structure elevation must be to an elevation sufficient to raise the finished first floor above the elevation of the 100-year flood event. Therefore, property owners who accept that form of flood barrier would receive assistance to implement 100-year protection.

Funding and Implementation Responsibility (Both Locations): For flood walls or berms at the top-of-bank of San Anselmo Creek or Fairfax Creek on privately owned parcels and with the property owners' permission, the Flood Control District shall fund, design, build, and maintain all aspects of those measures, including their possible future removal if implementation of other flood risk reduction projects renders these flood walls or berms unnecessary as determined by the Flood Control District. For a flood barrier that involves improvements or modifications to privately owned habitable structures covered by Mitigation Measure 4.9-4 (structure elevation, wet proofing, dry proofing, basement removal and construction of an addition to house water heaters, furnaces, and similar home appliances, etc.), the Flood Control District shall fully fund the design and provide funding to the property owner for implementation –that is proportional to the increased flood depth with the project. The funding would be provided to the property owner to implement these modifications or improvements. The property owner would be responsible for construction, implementation, and future maintenance of the structure and any associated flood mitigation measures or improvements.

Future Design Details – Flood Mitigation

Several commenters requested more detailed descriptions of the flood barriers specified in Draft EIR Mitigation Measure 4.9-4, or questioned whether a significance conclusion could be reached based on the level of detail provided in Draft EIR Mitigation Measure 4.9-4.

As described in State CEQA Guidelines Section 15126.4(a)(1)(B), while formulation of mitigation measures should not be deferred until some future time, measures may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way. The details of a mitigation measure may be left to later design or engineering work if mitigation that can meet a specified performance standard is known to be available.[24] Given the mandate of the Flood Control District and the ubiquity of flood protection methods with demonstrated flood protection performance, Mitigation Measure 4.9-4 could reasonably achieve the specified performance standard (to ensure existing habitable structures would not be newly inundated by the 25-year flood event).

Environmental Impacts of Flood Risk Mitigation

Some comments requested clarification or further description of impacts of non-structural measures. Some stated that the EIR needed to be more specific about the potential environmental impacts of those mitigation measures themselves. The flood barriers listed in the clarified Mitigation Measure 4.9-4, with the exception of berms or floodwalls which were analyzed in the Draft EIR, are unlikely to have additional significant environmental effects that were not analyzed in the Draft EIR because they would consist of alterations to individual structures.

The direct and indirect physical effects of Draft EIR Mitigation Measure 4.9-4 (flood barriers) were identified in Draft EIR Section 4.9, Hydrology and Water Quality, and in other relevant Draft EIR sections. As noted in Section 4.9, implementation of Mitigation Measure 4.9-4 would have other direct and indirect effects on the physical environment similar to those identified for the Project. These impacts are evaluated in other sections of this EIR and include emissions of criteria air pollutants and toxic air contaminants during construction, activities that could degrade water quality during construction, mortality or injury of special-status species and nesting birds, disturbance of wetlands during construction, noise during construction, and increases in downstream and upstream scour during operations. With implementation of the mitigation measures identified for these impacts in this document, the impacts of Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, would be less than significant.

To further clarify, the potential impacts of implementing that mitigation measure and other mitigation measures, evaluated in the Draft EIR are:

- Criteria air pollutant emissions during construction, evaluated in Impact 4.3-1, reduced to less than significant with implementation of Mitigation Measure 4.3-1, BAAQMD Basic Mitigation Measures

[24] *Dry Creek Citizens Coalition v County of Tulare* (1999) 70 CA4th 20, 25.

- Toxic air contaminant emissions during construction, evaluated in Impact 4.3-4, reduced to less than significant with implementation of Mitigation Measure 4.3-4, Tier 4 Engines for Construction Equipment
- Inefficient energy use during construction, reduced to less than significant with implementation of Mitigation Measure 4.3-1, BAAQMD Basic Mitigation Measures
- Effects on sensitive aquatic species, evaluated in Impact 4.5-1, reduced to less than significant with implementation of Mitigation Measures 4.5-1a, 4.5-1b, and 4.5-1c
- Effects on special-status plants, evaluated in Impact 4.5-2, reduced to less than significant with implementation of Mitigation Measure 4.5-2
- Effects on special-status amphibians, reduced to less than significant with implementation of Mitigation Measure 4.5.-3a, Install Wildlife Exclusion Fencing, and Mitigation Measure 4.5-3b, Avoid Impacts to California Red-legged Frog and Western Pond Turtle
- Effects on nesting birds and owls, reduced to less than significant with implementation of Mitigation Measure 4.5.-4, Avoid Impacts to Special-status and Nesting Birds, including Raptors and Northern Spotted Owls
- Effects on special status bats, reduced to less than significant with implementation of Mitigation Measure 4.5-6, Avoid Impacts to Special-status Bats
- Effects on sensitive natural communities, reduced to less than significant with implementation of Mitigation Measure 4.5-7a, Vegetation Protection for Sensitive Natural Communities, Mitigation Measure 4.5-7b, Habitat Restoration and Monitoring Plan, Mitigation Measure 4.5-7c, Avoid Spread of Invasive Species and Pathogens
- Effects on wetlands and other waters, reduced to less than significant with implementation of Mitigation Measure 4.5-7a and 4.5-7b
- Effects on wildlife movement corridors, reduced to less than significant with implementation of Mitigation Measures 4.5-1a, 4.5-3b, 4.5-4, and 4.5-6
- Effects related to tree removal, reduced to less than significant with implementation of Mitigation Measure 4.5-10, Mitigation for Removal of Heritage or Protected Trees
- Hazards to the public or environment related to hazardous materials, reduced to less than significant with implementation of Mitigation Measures 4.8-2a, Check 700/750 Sir Francis Drake Boulevard investigation status, 4.8-2b, Health and Safety Plan, and 4.8-2c, Soil Management Plan
- Effects related to water quality standard violations or other degradation of water quality, reduced to less than significant with implementation of Mitigation Measure 4.9-1, Implement Dewatering BMPs for In-Water Work
- Effects on sedimentation and erosion, reduced to less than significant with implementation of Mitigation Measures 4.9-3a. Prioritize Nursery Basin Reach for Stream Maintenance, and 4.9-3b, Scour Analysis and Protection Measures
- Effects on transportation, evaluated in Impacts 4.15-1 through 4.15-4, reduced to less than significant with implementation of Mitigation Measure 4.15-1

The Flood Control District intends for the language in these measures to apply to flood barriers implemented pursuant to Mitigation Measure 4.9-4, Provide Flood Protection to Substantially Affected Areas, as explained on Draft EIR page 4.9-59 and as clarified and amplified in this response. Accordingly, the potential flood barriers that may require CEQA review would be similar to the berms or floodwalls listed in Mitigation Measure 4.9-4. The impacts of revised Mitigation Measure 4.9-4 would be similar in type to those already identified in the Draft EIR as set forth in Section 4.9 and restated above. Therefore, the same mitigation measures identified for the associated impacts in the EIR for the project as a whole would reduce these impacts to levels that would be less than significant.

Significant and Unavoidable Impacts and Statement of Overriding Considerations

Pursuant to CEQA, no public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding.[25] When a lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record.[26] This statement of overriding considerations expresses a lead agency's views on the ultimate balancing of the merits of approving a project despite its anticipated environmental damage. This balancing may include competing public objectives such as environmental, legal, technical, social, and economic factors.

Within a CEQA framework, this written statement explains the reasons why the project would (or could, in this case, if the property owners do not accept the proposed mitigation measures) result in one or more unavoidable adverse impacts, the project's stated benefits are sufficient to warrant project approval. In this case, in larger events such as a 25-year event, models indicate that new inundation could occur on a portion of one parcel in the area upstream of the Nursery Basin, a significant and unavoidable impact, if that property owner does not accept offered mitigation measures. The Flood Control District would need to prepare findings and a statement of overriding considerations in accordance with CEQA should the project be approved.

In this case, the modeling indicates that in larger floods such as a 25-year event, up to 18 downstream properties (17 of which are private properties already in the 100-year special flood hazard zone) could experience slight increases in inundation depth or extent, which would be a significant and unavoidable impact only if those property owners do not agree to allow implementation of the mitigation measures on their private properties. Because the Flood Control District cannot control whether the mitigation measures are constructed on private property, it would need to prepare findings and a statement of overriding considerations in accordance with CEQA if the project is approved.

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25 State CEQA Guidelines Section 15091.
26 State CEQA Guidelines Section 15093.

2.2.7 Master Response 7: Erosion, Sedimentation, and Channel Maintenance

Multiple comments discussed erosion and sedimentation impacts of the Project, impacts of channel maintenance, and the role of channel maintenance related to the existing Stream Maintenance Program and proposed stream maintenance for the Project. This master response addresses:

- Existing sediment production in the watershed
- Changes to erosion and sedimentation at the Nursery Basin site
- Changes to erosion and sedimentation downstream of the Downtown San Anselmo site
- Questions regarding the existing Stream Maintenance Program and the role of channel maintenance in flood control
- Environmental impacts of mitigation measures

2.2.7.1 Changes to Erosion and Sedimentation Patterns

Draft EIR Section 4.9, Hydrology and Water Quality, describes the existing erosion and sedimentation patterns in the Ross Valley watershed and evaluates the project's impacts on those patterns. Fairfax Creek watershed constitutes approximately 3.6 square miles of the 28-square-mile Ross Valley Watershed. As discussed starting on Draft EIR page 4.9-1, previous detailed studies estimated that Fairfax Creek contributes less than one percent of the total bed load sediment in Corte Madera Creek at the City of Ross. The average annual bedload sediment inflow at Ross is estimated to be about 7,000 tons per year (Stetson, 2000). The annual sedimentation rate in the Corte Madera Creek channel averaged 22,000 cubic yards (or 29,700 tons) between 1966 and 2004. Sediment enters the channel from the Bay as well as from other stream sources in the watershed, accounting for the over 20,000-ton difference between bedload sediment at the City of Ross and sediment deposition downstream in the Corte Madera Creek channel.

The Draft EIR evaluates changes in erosion and sedimentation caused by the Project in Impact 4.9-3 (beginning on page 4.9-46). Impacts were evaluated upstream and downstream of the Nursery Basin site and upstream and downstream of the Downtown San Anselmo site. With implementation of Mitigation Measures 4.9-3a, Prioritize Nursery Basin Reach for Stream Maintenance, and 4.9-3b, Scour Analysis and Protection Measures Upstream of the Downtown San Anselmo Site, the impacts would be less than significant.

Summary of Impacts at the Nursery Basin Site

As described in Draft EIR Chapter 3, *Project Description,* and shown in Draft EIR Figure 3-9, the proposed Project includes design features to reduce erosion, including scour protection (such as rock slope protection or similar materials) along the southern and northern banks of the channel between the diversion structure and the existing bridge and upstream of the existing bridge. Scour protection would also be installed within the Fairfax Creek channel from the downstream side of the diversion structure to approximately 10 feet downstream of the outlet pipe.

The Draft EIR discussion of sedimentation and associated flooding conservatively assumes high sediment production volumes for Fairfax Creek upstream of the Nursery Basin site. For purposes of the Draft EIR analysis, the Flood Control District evaluated the Project based on a worst-case estimate of sediment accumulation. This estimate was developed by applying known sediment production rates from a nearby watershed during an especially large storm (Devils Gulch watershed), during an already wet year (1982), to the Fairfax Creek watershed. As described in Impact 4.9-3, using conservative assumptions over 2,100 cubic yards (or approximately 2,840 tons) of sediment was estimated to deposit in the basin and behind the diversion structure in Fairfax Creek. This value is considered very conservative, given previous estimates of approximately 70 tons per year of bedload sediment production for the entire Fairfax Creek watershed (one percent of the 7,000 ton annual bedload sediment inflow at the City of Ross, described above and in Draft EIR Section 4.9.1). Sediment production estimates based on sediment measurements from a different nearby watershed, combined with known stream power information for Fairfax Creek, also result in a much lower sedimentation volume than the estimate used for this EIR's impact analysis.[27]

As discussed in Impact 4.9-3 (page 4.9-48), additional modeling and analysis would be performed during the design stage to determine the proper sizing and operation of the opening to support the intended flood risk reduction function and to allow sediment transport. Generally, the opening would only be partially closed during high flow events (the only times when the basin would operate), thus reducing the volume of sediment filling the channel during basin operations. The design elevation of the opening would be evaluated and informed by two-dimensional sediment transport modeling. More frequent flows during the wet season after operation of the basin would be able to pass through the diversion structure, and could remobilize some of the deposited gravel bed materials (i.e., cause the materials to continue moving downstream), which would help maintain the existing pattern of sediment aggradation and transport within Fairfax Creek. Upon further detailed study to determine the rates of sediment production and transport in Fairfax Creek, the estimate of sediment accumulation may decrease.

As described in Impact 4.9-3 (page 4.9-47 through 48), the sediment would be removed from the creek channel upstream of the diversion structure. Sediment accumulation is not anticipated anywhere outside of the creek channel or FDS basin. It would be removed from both of those locations and either beneficially reused in a restoration project or disposed of at an appropriate waste management facility.

Impacts of the Project associated with sediment removal were evaluated in the topic sections of the Draft EIR, because the Project was assumed to include an annual volume of up to 1,600 cubic yards of sediment removal, as described on Draft EIR page 3-42. While this volume is lower than the volume of sediment removal proposed as part of Mitigation Measure 4.9-3a, Prioritize Nursery Basin Reach for Stream Maintenance, as described in greater detail below, this volume is

27 Sediment transport modeling was conducted, and sedimentation volume estimated, using both Devils Gulch Creek and San Geronimo Creek sediment data. The sedimentation volumes estimated using the San Geronimo Creek bedload rating curve were about 17 and 27 cubic yards during the 10- and 25-year flood events, respectively. The sedimentation volumes estimated using the Devils Gulch bedload rating curve were over 1,300 and 2,100 cubic yards during the 10- and 25-year flood event, respectively (Stetson Engineers, Sediment Transport Modeling for the San Anselmo Flood Risk Reduction Project at the Sunnyside Nursery Detention Basin, April 19, 2018).

within the existing Stream Maintenance Program limitations on annual removal of sediment from one location within the watershed (the Stream Maintenance Program limits removal at any one site within the watershed to up to 2,100 cubic yards per year, as discussed on Draft EIR page 4.9-23). The impacts of sediment removal were evaluated during environmental review of the Stream Maintenance Program.

Erosion and Sedimentation Downstream of the Downtown San Anselmo Site

As discussed in Draft EIR Impact 4.9-3, changes in sedimentation and erosion in San Anselmo Creek downstream of the building at 634-636 San Anselmo Avenue (removal of which would expand channel capacity) were estimated based upon modeled changes in flow velocities. In summary, the increases in flow velocities[28] would be small or negligible, and within the range of variability in the existing flow velocity conditions along this reach. There would be no change in the flow velocities during a 10-year event. During a 25-year event, depending on the location along that stream reach, the flow velocities would increase by up to 4 percent; however, flow velocity increases at all of the affected locations would be within the existing range of flow velocity variability. During a 100-year event, the flow velocity would increase by 1 percent to 3 percent, which is also within the existing range of flow velocity variability. This increase in the 100-year event would be a smaller increase than that which would occur in a 25-year event because the baseline (non-project) conditions for the 100-year event are already high. As concluded in the Draft EIR (pages 4.9-49 through -51), these changes in flow velocities indicate that the potential sediment production rates downstream of 634-636 San Anselmo Avenue would not substantially change during project operations.

2.2.7.2 Channel Maintenance in the Ross Valley Watershed

The Flood Control District developed a Stream Maintenance Program to provide flood protection and maintain channel conveyance capacity while enhancing natural resources within the subject streams. As described starting on Draft EIR page 4.9-23, the Stream Maintenance Program waste discharge requirements (RWQCB Order No. R2-2017-0028)[29] cover routine management actions associated with providing flood protection and maintaining channel conveyance capacity, including sediment management, vegetation management, bank stabilization, and associated actions. These activities can occur in flood control channels, natural channels, and other facilities on an as-needed basis. The details of the Order's terms and conditions come largely from the Marin County Stream Maintenance Program Manual[30], which can be revised as needed (subject to RWQCB approval) to add new streams or new activities. The Order includes limits on the lengths of channels and the volumes of material that can be addressed in a given year, including limiting the maximum volume of debris or sediment removed from any site to 2,100 cubic yards. Over the Order's 5-year term, these activities may not exceed a program wide cumulative total of 25,000 linear feet and 55,000 cubic yards of sediment and debris.

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28 Determined by comparing the modeled future flow velocities along the creek channel to the standard deviation of the set of modeled existing flow velocities along the same channel. As explained in Draft EIR Section 4.9, flow velocities vary widely in modeled existing conditions (between 3 and 7 feet per second). All modeled changes in flow velocities were within one standard deviation of the mean of existing flow velocities.

29 Available online at https://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2017/July/5c_final_to.pdf

30 The Marin County Stream Maintenance Manual is available online at http://www.marinwatersheds.org/resources/publications-reports/marin-county-stream-maintenance-manual

The number of sediment removal projects undertaken annually and the quantity of sediment removed in a given year depend on the frequency and extent of past maintenance activities and the weather and hydrologic conditions during recent years. Sediment removal requirements are generally greater following a wet winter with higher than usual runoff, slope erosion, and sediment delivery compared to an average or dry winter when sediment yields are less.

As explained above, limitations on sediment removal volumes are included in the Stream Maintenance Program. Thus, while dredging the channels in Ross Valley watershed could reduce some significant environmental impacts of the Project, increased channel maintenance (or dredging) as an alternative method of flood risk reduction would not be feasible due to the existing limitations in the Stream Maintenance Program. In addition, the majority of the parcels along creeks within the watershed include creek area, are privately owned, which limits the Flood Control District's ability to conduct dredging there.

2.2.7.3 Impacts of Mitigation Measure 4.9-3a

Some comments stated that the impacts of Draft EIR Mitigation Measure 4.9-3a, Prioritize Nursery Basin Reach for Stream Maintenance, were not evaluated in the Draft EIR. With implementation of Mitigation Measure 4.9-3a, watershed-wide, sediment removal volumes would remain unchanged because the overall volume of sediment removal allowed under the Stream Maintenance Program would not change (as described above). The Stream Maintenance Program is designed to be flexible in order to address the fact that locations where sediment removal is needed vary from year to year. The impacts of the Stream Maintenance Program were identified during environmental review of that program. No new significant impacts or mitigation measures were identified during the public comment period or in the process of responding to comments received.

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