Ross Valley Flow Reduction Study Report

Prepared for

Marin County Water Conservation and Flood Control District

November 2015

CH2M HILL, Inc.
155 Grand Ave. Suite 800
Oakland, CA 94612

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Acronyms and Abbreviations

Board	Flood Zone 9 Advisory Board
Caltrans	California Department of Transportation
cfs	cubic feet per second
CIP	*Capital Improvement Plan Study for Flood Damage Reduction in Flood Zone 9/Ross Valley*
District	Marin County Flood Control and Water Conservation District
LID	Low Impact Development
PEIR	Programmatic Environmental Impact Report
Program	Ross Valley Flood Protection and Watershed Program
TWG	Technical Working Group
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

SECTION 1

Introduction and Project Background

1.1 Introduction

The Ross Valley Flood Protection and Watershed Program (Program) was initiated after the devastating floods that occurred in Ross Valley during December 2005. The Program is a regional effort led by the Marin County Flood Control and Water Conservation District (District) Flood Control Zone 9; the Towns of Ross, San Anselmo, and Fairfax, California; and the City of Larkspur, California. The primary goal of the Program is to substantially reduce the frequency and severity of flooding. Secondary goals are to restore natural hydrological and ecological functions to creeks, and to enhance opportunities for public enjoyment within the watershed. The Program ultimately will provide 100-year flood protection for the citizens of Ross Valley, and will be implemented in phases. The full Program, described in the *Capital Improvement Plan Study for Flood Damage Reduction in Flood Zone 9/Ross Valley* (CIP),[1] includes five detention basins and more than 180 channel improvement measures, including bridge replacements, spread throughout the watershed that collectively, and in concert with improvements by the U.S. Army Corps of Engineers (USACE) to Unit 4 of its Corte Madera Creek flood control project, will provide an approximately 100-year level of flood protection.

To focus initial implementation efforts, District staff have proposed a near-term goal of achieving a 25-year-flood level of protection valley-wide within a 10-year timeframe, known as the 10-Year Work Plan. The 10-Year Work Plan is intended to be consistent and compatible with ultimate build-out of the complete Program to achieve 100-year flood protection. Certain elements of the 10-Year Work Plan are designated as Baseline Measures because of their significant flood reduction benefit or eligibility for funding and implementation under other programs. In this regard, detention basins were deemed Baseline Measures because they significantly reduce peak flow in stream channels, bridge replacements because they have funding authorized from the California Department of Transportation (Caltrans) and remove flow constrictions at key points in the watershed, and Lower Corte Madera Creek Improvements because they are needed to prevent localized flooding in the near term. The District has prioritized the Baseline Measures for near-term implementation. The schematic in Figure 1-1 below shows the "nested" relationship between the Baseline Measures, the 10-Year Work Plan, and full Program.

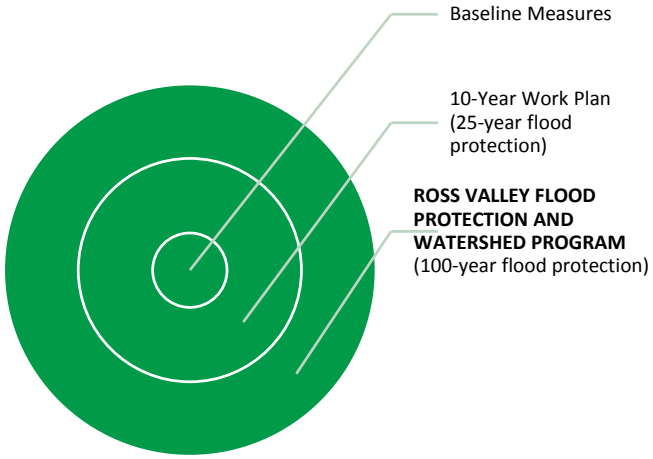

Figure 1-1. Relationship between Baseline Measures, 10-year Work Plan, and Full Program
Ross Valley Flood Protection and Watershed Program

[1] Stetson Engineers Inc. 2011. *Capital Improvement Plan Study for Flood Damage Reduction in Flood Zone 9/Ross Valley.* Prepared for Marin County Flood Control and Water Conservation District, Flood Zone 9. May.

A primary source of funding for the Program is the voter-approved annual storm drainage user fee, approved in 2007.

Specifically, passage of the annual storm drainage user fee ordinance provides funding to meet the following goals:

- Reduce damage due to flooding
- Offer solutions for homes and businesses
- Aid homeowners in repairing stream banks
- Remove bottlenecks that impede water flow
- Maintain natural creek functions
- Reduce pollutants entering the San Francisco Bay
- Incorporate habitat enhancements
- Improve fish passage

Additionally, funding has been secured from state funding sources for the following projects:

District

- Phoenix Lake Retrofit Project

Town of San Anselmo

- Memorial Park Detention Basin Project
- Nokomis Avenue Bridge Replacement Project
- Madrone Avenue Bridge Replacement Project
- Sycamore Avenue/Center Boulevard Bridge Replacement Project

Town of Ross

- Winship Avenue Bridge Replacement Project

The District and its partners plan to pursue additional grants to support other parts of the Program.

To define the parameters of the Program, the District prepared a Capital Improvement Plan Study to determine what would be required to contain the one percent recurrence interval (i.e., 100-year) flood event along Fairfax Creek, San Anselmo Creek, and Corte Madera Creek along with all their contributing tributaries in Ross Valley. The Program must also meet the flow reduction goals of the USACE's Corte Madera Creek Unit 4 project downstream of the study area near Larkspur.

1.2 Project Background

The primary objective of the CIP was to develop a project that contains the one percent annual chance flood event within the stream channels in the project area by enlarging some channels, removing or modifying existing obstructions to flow, and reducing the peak discharge by attenuating the flows in regional detention facilities. The CIP identified approximately 180 creek measures to be implemented to increase the conveyance of the creeks and tributaries as well as five possible regional detention facilities. Figure 1-2 shows the locations of the creek improvement areas and potential detention facility sites proposed to meet the Program goals.

The CIP evaluated potential detention basin sites within Ross Valley that met all of the following criteria:

- Close proximity to Corte Madera Creek or major tributaries to Corte Madera Creek
- Has potential to reduce flooding at key breakout points in the Towns of Ross, San Anselmo, and Fairfax
- Parcels with open land and very few structures
- Has a current use compatible with storm water detention
- Is publicly owned

Figure 1-2. Proposed Ross Valley Capital Improvment Program PLATE 2-1 (General)

DATE: January 27, 2011 | JN: 2292-3

ROSS VALLEY WATERSHED PROGRAM: MASTER PLAN FOR FLOOD REDUCTION AND CREEK MANAGEMENT

geomorph | STETSON ENGINEERS INC.

LOMA ALTA DETENTION BASIN (PLATE 2-5.2 (LA))

LEFTY GOMEZ DETENTION BASIN (PLATE 2-6.2 (LG))

FAIRFAX CREEK IMPROVEMENTS (PLATE 2-2.1 (FF))

SLEEPY HOLLOW CREEK IMPROVEMENTS (PLATE 2-3.1 (SH))

MEMORIAL PARK DETENTION BASIN (PLATE 2-7.2 (MP))

RED HILL PARK DETENTION BASIN (PLATE 2-8.2 (RHP))

SAN ANSELMO CREEK IMPROVEMENTS (PLATE 2-4.1 (SA))

RECOMMENDED IMPROVEMENTS (FIGURE 2-1)

UPSTREAM END OF CONCRETE CHANNEL (STA:369+70)

USGS GAUGE @ ROSS

US ARMY CORPS OF ENGINEERS PROJECT

UPSTREAM END OF EARTHEN CHANNEL (STA:319+00)

PHOENIX LAKE DETENTION BASIN (PLATE 2-9.2 (PL))

MODEL DOWNSTREAM BOUNDARY STA:166+00

GALLINAS CREEK WATERSHED

TOMALES BAY LAGUNITAS CREEK WATERSHED

SAN RAFAEL WATERSHED

SAN FRANCISCO BAY

FAIRFAX | SAN ANSELMO | BALD HILL | ROSS | KENTFIELD | GREENBRAE | LARKSPUR | SAN QUENTIN

Iron Spring Cr. | Fairfax Cr. | Bothin Cr. | Ascade Cr. | Blue Ridge Cr. | Spring Cr. | Curry Camp Cr. | SAN ANSELMO CR. | Deer Park Cr. | Wood Lane Cr. | Phoenix Cr. | Fish Gulch Cr. | Eldridge Cr. | Bill Williams Cr. | Tucker Cr. | East Peak Cr. | Tamalpais Cr. | Sleepy Hollow Cr. | Sorich Ck. | Ross Common | Murphy Cr. | Kiske Ck. | ROSS CR. | McAllister Cr. | King Mountain Cr. | CORTE MADERA CR. | Larkspur Cr. | Low Canal Cr.

Sir Francis Drake Blvd | Center Blvd | Butterfield Rd | Broadway | Forest Ave | Francis Ave | Central St | Scenic Ave | Red Hill Rd. | 4th St | 2nd St | 3rd St | Bolinas Rd | Fairfax Bolinas Rd | Deer Park Rd | Shafer Grade Rd | Fish Gulch Fire Rd | Southern Marin Line Fire Rd | Laguntas Rd | Goodhill Rd | Woodland Rd | Bon Air Rd | Magnolia Ave | Meadowood Dr | Greenbrae Boardwalk | Highway 101 | W Hwy 580 | E Hwy 580

Marin General Hospital | PHOENIX LAKE

LEGEND

- CREEK
- HIGHWAY / MAJOR ROAD
- WATERSHED BOUNDARY
- CREEK IMPROVEMENT AREA
- DETENTION BASIN
- US ARMY CORPS OF ENGINEERS PROJECT
- SEDIMENTATION AND CHANNEL CAPACITY MANAGEMENT ZONE

SCALE (Feet)
0 1250 2500 5000

SCALE (Miles)
0 0.25 0.5 1

N W E S

F:\DATA\2292\AutoCAD\Improvements\General Map.dwg

Based on this set of criteria, the CIP identified five potential sites suitable for detention: Phoenix Lake, Memorial Park, Lefty Gomez Field, Loma Alta Open Space Preserve, and Red Hill Community Park. The CIP envisions implementation of each of these flood reduction measures over the next 10-20 years as funding allows.

The Town of San Anselmo was successful in obtaining a grant from the California Department of Water Resources (DWR) to initiate the design and construction of the Memorial Park detention basin site. However, after receiving a significant amount of community comments on the criteria used to select Memorial Park as one of the primary detention basin sites, the District and the Flood Zone 9 Advisory Board (Board) decided to retain the services of an outside consultant, CH2M HILL, Inc. (CH2M), to revisit the detention basin sites recommended in the CIP. The District decided to re-evaluate the previous detention site selection criteria and add additional selection criteria to provide a greater range of potential benefits from the detention alternatives. CH2M was asked to conduct a Flow Reduction Study to identify all potential detention basin sites within Ross Valley as well as identify other flow reduction elements and storage options to meet the Program goals. CH2M was asked to perform a comprehensive analysis that addressed many of the community's concerns and included evaluation of alternate solutions suggested by the community.

This report summarizes the process and the recommendations developed by CH2M for the Ross Valley Flow Reduction Study.

SECTION 2

Description of Flow Reduction Elements

The first step of this study was to develop a comprehensive list of alternatives that could reduce the frequency and severity of flooding in Ross Valley, including considering alternative flow reduction measures to the five potential detention basin locations listed in the CIP. A comprehensive list of proposed flow reduction elements was developed and presented to the Technical Working Group (TWG) on February 26, 2015 and to the Board on March 17, 2015; these elements are listed below. The alternative measures considered include a variety of elements that are alternative approaches to reducing flows as well as alternative detention basin sites.

2.1 Alternative Flow Reduction Elements

Several members of the community have suggested that the District consider alternative flow reduction measures in lieu of constructing detention basins. These alternative flow reduction measures were developed based on community and TWG recommendations as well as CH2M's experience working on other similar flood reduction projects. Figure 2-1 includes an Alternative Overview Map showing the approximate location of the flow reduction measures that were evaluated. A brief description of each of the identified alternative flow reduction measures is presented below.

A. **Channel Widening through San Anselmo**

To help alleviate flooding through the San Anselmo downtown area, this alternative would widen the San Anselmo Creek channel from Center Boulevard to Tunstead Avenue through the removal or improvement of piers and foundations in the channel, redesign of Creek Park, and the removal and excavation of the parking lot between Sir Francis Drake Boulevard and the channel. This alternative would also look at the addition of flood walls not to exceed 42 inches above ground level so that pedestrian views would not be impeded.

B. Bypass Conduit through San Anselmo

Option A, Cedar Street Conduit: Overflows from the San Anselmo Creek channel through the Town of San Anselmo tend to flow away from the main channel to the west towards Cedar Street. This alternative would provide a bypass conduit that would run beneath Cedar Street parallel to San Anselmo Creek. This parallel pipe would collect water from the channel near Hazel Avenue and Center Boulevard and would return flow to Ross Creek at Shady Lane. This alternative could double as underground storage due to the length of the conduit. Control gates could be added to store water and release it when safe.

Option B, San Anselmo Avenue Conduit: This alternative would provide a bypass conduit that would run beneath San Anselmo Avenue parallel to San Anselmo Creek. This parallel underground culvert would be constructed using trenchless technologies to minimize impacts to downtown businesses. Trench pits could be constructed in/adjacent to the creek. This bypass alternative would collect water from the channel near Hazel Avenue and Center Boulevard and would return flow to Ross Creek at Shady Lane. This alternative could double as underground storage due to the length of the conduit. Control gates could be added to store water and release it when safe.

C. Bypass Conduit through Ross

To help alleviate flooding through the Town of Ross, this alternative would include a bypass conduit beneath Poplar Avenue and Kent Avenue. This would take flow from Corte Madera Creek near Ross Common Park and discharge flow into Tamalpais Creek at Kent Avenue. This alternative could double as underground storage due to the length of the conduit. Control gates could be added to store water and release it when safe.

D. Bypass Conduit through Fairfax

To help alleviate flooding through Fairfax, a bypass conduit beneath Sir Francis Drake Boulevard, Broadway Boulevard, and Center Boulevard would take flow from Fairfax Creek near Marin Road and discharge flow into San Anselmo Creek near the Fairfax Post Office. This alternative could double as underground storage due to the length of the conduit. Control gates could be added to store water and release it when safe.

Note that the proposed bypass flow reducing elements listed above were evaluated two ways: 1) as bypass culverts that moved the flow from upstream to downstream around areas that currently flood, effectively increasing the conveyance capacity for specific reaches of the system, and 2) as underground detention systems.

E. Setback Levees at A.E. Kent Middle School

To provide additional flow capacity through lower Corte Madera Creek, the addition of setback levees (that is, levees that are constructed at a distance from the river channel in order to allow the river to occupy a portion of its floodplain) on the west side of the A.E. Kent Middle school could help spread flow out and provide flood relief to the lower portion of the valley.

F. Setback Levees at Hal Brown Park at Creekside

To provide additional flow capacity through lower Corte Madera Creek, the addition of setback levees on the east side of Hal Brown Park could help spread flow out and provide flood relief to the lower portion of the valley.

G. Utilize Surface Streets for Conveyance

Modify existing streets by raising curb height to allow storm conveyance on the street surface (curb to curb) in downtown San Anselmo, or in the median of Red Hill Avenue by converting the median to a below-grade channel. The street or median would act as a shallow stream instead of using an underground culvert system.

H. Purchase and Removal of Flood-Prone Properties

To help improve public safety and reduce structure loss and damage, repetitive loss structures can be considered for purchase and removal through Federal Emergency Management Agency programs. These are at various locations throughout the basin and are not depicted on Figure 2-1.

I. Flood-Proofing

Opportunities and methods to flood-proof structures can be recommended to the general public, along with a program of financial assistance to install flood-proofing elements, to reduce exposure to flood damage. These opportunities are located throughout the basin and not depicted on Figure 2-1.

J. Implement Low Impact Development (LID) Provisions

Opportunities to modify existing facilities to implement an LID approach to reduce runoff into the creek (and therefore reduce creek water levels during a storm) may include installing permeable pavement (which allows storm water to percolate into the ground), bio-swales (vegetated depressions that collect storm runoff), etc. Implementation of a community-wide program to collect storm water using rain barrels and cisterns would be another example.

K. Underground Parking Detention

Underground parking garages could be constructed to provide detention storage when needed.

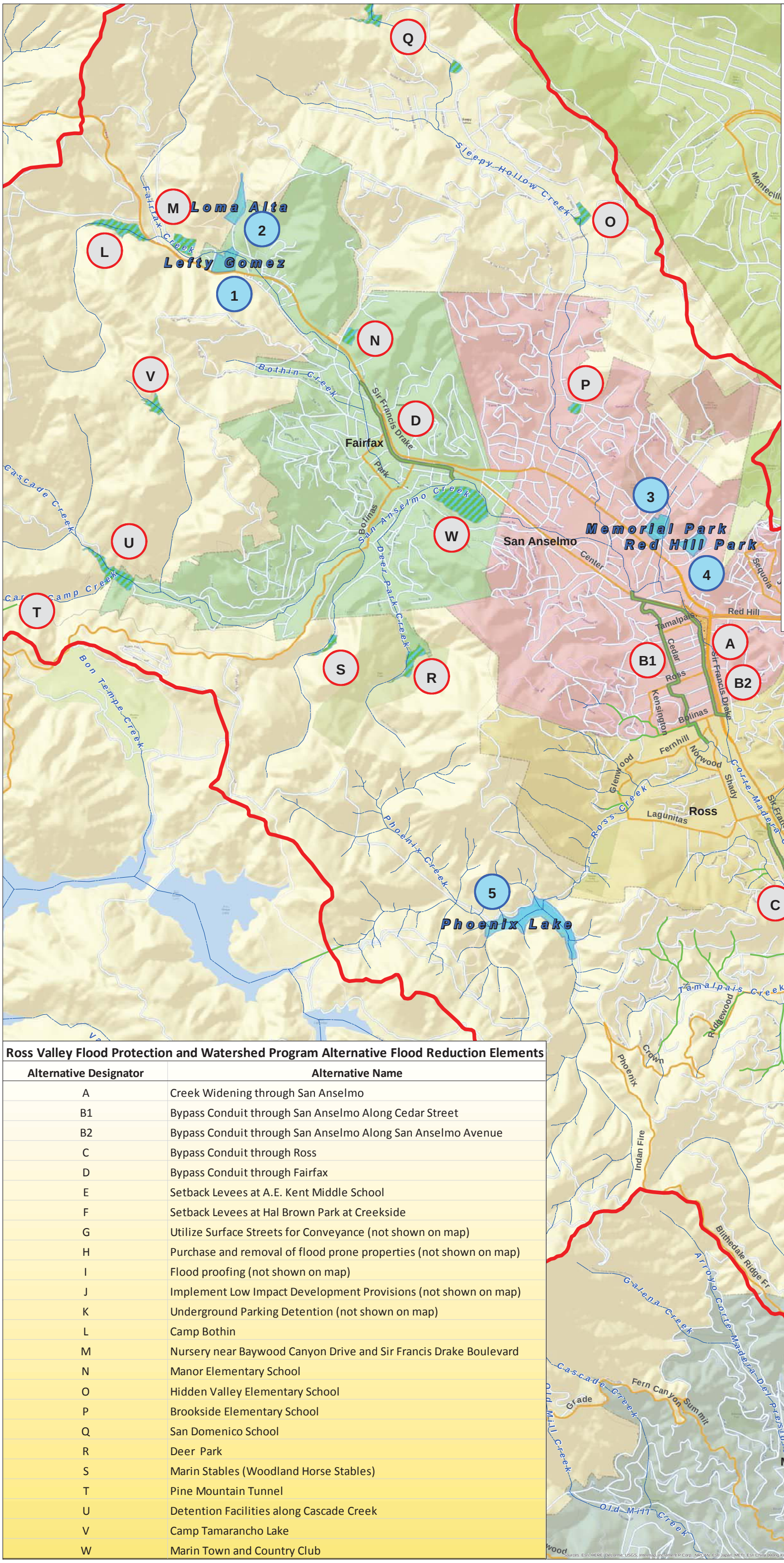

FIGURE 2-1
Alternative Overview Map
Ross Valley Flood Protection and Watershed Program

Ross Valley Flood Protection and Watershed Program Alternative Flood Reduction Elements

Alternative Designator	Alternative Name
A	Creek Widening through San Anselmo
B1	Bypass Conduit through San Anselmo Along Cedar Street
B2	Bypass Conduit through San Anselmo Along San Anselmo Avenue
C	Bypass Conduit through Ross
D	Bypass Conduit through Fairfax
E	Setback Levees at A.E. Kent Middle School
F	Setback Levees at Hal Brown Park at Creekside
G	Utilize Surface Streets for Conveyance (not shown on map)
H	Purchase and removal of flood prone properties (not shown on map)
I	Flood proofing (not shown on map)
J	Implement Low Impact Development Provisions (not shown on map)
K	Underground Parking Detention (not shown on map)
L	Camp Bothin
M	Nursery near Baywood Canyon Drive and Sir Francis Drake Boulevard
N	Manor Elementary School
O	Hidden Valley Elementary School
P	Brookside Elementary School
Q	San Domenico School
R	Deer Park
S	Marin Stables (Woodland Horse Stables)
T	Pine Mountain Tunnel
U	Detention Facilities along Cascade Creek
V	Camp Tamarancho Lake
W	Marin Town and Country Club

2.2 Alternative Detention Basin Locations

In addition to the flow reduction measures described above, a comprehensive list of alternative detention basin sites was developed to compare against the five detention basin sites proposed as part of the Baseline Measures in the CIP. The project team identified the following alternative detention basin sites based on sites visits and consultation with the District and others familiar with the area.

These potential detention basin sites are listed below by watershed and the approximate location is shown on Figure 2-1 with the corresponding letter designation.

2.2.1 Fairfax Creek Watershed Upstream of Fairfax Town Hall

L. Camp Bothin Detention Facility

This facility would construct a new embankment to store flows with a regulated outfall. This would require a flood pool easement west of Sir Francis Drake Boulevard on the Camp Bothin property.

M. Nursery near Baywood Canyon Drive and Sir Francis Drake Boulevard

This is a large open site that could provide detention storage. Property would require the acquisition of a drainage easement or the purchase of the parcel to be used for detention storage.

N. Manor Elementary School

Detention could be provided at the park space associated with the school to help reduce downstream peak flows.

2.2.2 Sleepy Hollow Creek Watershed above Sycamore Bridge in San Anselmo

O. Hidden Valley Elementary School

The site has potential to provide detention on Sleepy Hollow Creek. This alternative would require the reconstruction of a portion of the school park facilities.

P. Brookside Elementary School

The site has the potential to provide detention on Sleepy Hollow Creek. This alternative would require the reconstruction of a portion of the school park facilities.

Q. San Domenico School

Detention will be investigated at two locations. This site has the potential to provide detention within an existing sports field and open space above the campus. Detention at this site would help to alleviate and reduce flooding along Sleepy Hollow Creek.

2.2.3 San Anselmo Creek Watershed above Sycamore Bridge in San Anselmo

R. Deer Park

This site has the potential to provide detention at the park space associated with the area. This would provide an opportunity to further expand the park amenities and provide connections to local trails while reducing flooding on Deer Creek.

S. Marin Stables

This site has the potential to provide detention in the open space upstream of the Marin Stables site. Existing structures and stables would not be impacted and the facility would continue to operate as a stable with riding trails as it does today.

T. Pine Mountain Tunnel

This abandoned water supply tunnel previously moved water between San Anselmo Creek and Lagunitas Creek. Currently, this tunnel is no longer used for water supply purposes. This alternative would divert high flows from San Anselmo Creek and use the existing tunnel infrastructure, with modifications, to store high flows and release them once the threat of flood has passed through the valley. The tunnel would need to be investigated for suitability and required modifications to make this existing facility safe for flood storage.

U. Detention Facilities along Cascade Creek

This site has the potential to provide detention at two separate proposed locations on Cascade Creek. These two sites would be located immediately upstream of residential developed areas adjacent to the Cascade Canyon Open Space Preserve and would inundate land on the preserve. Portions of the Cascade Canyon Open Space Preserve are considered environmentally sensitive, which would be a consideration in the feasibility of the sites.

V. Camp Tamarancho Lake

This site is located along a tributary that empties into San Anselmo Creek above Fairfax as part of the Boy Scouts of America camp facility. Potential detention sites would likely require relocation of a few structures on site.

W. Marin Town and Country Club

The former Marin Town and Country Club site is a large open expanse below the confluence of Fairfax Creek and San Anselmo Creek. This parcel is currently privately held and would require the purchase of the property or the acquisition of a drainage easement to provide permanent flood control. This location includes three different potential configurations on the site: W1) a detention basin, W2) a smaller underground cistern proposed by the owner, and W3) an underground parking garage that would allow development above the facility.

SECTION 3

Evaluation Process

Figure 3-1 shows the overall process used to evaluate the alternatives presented in Section 2.

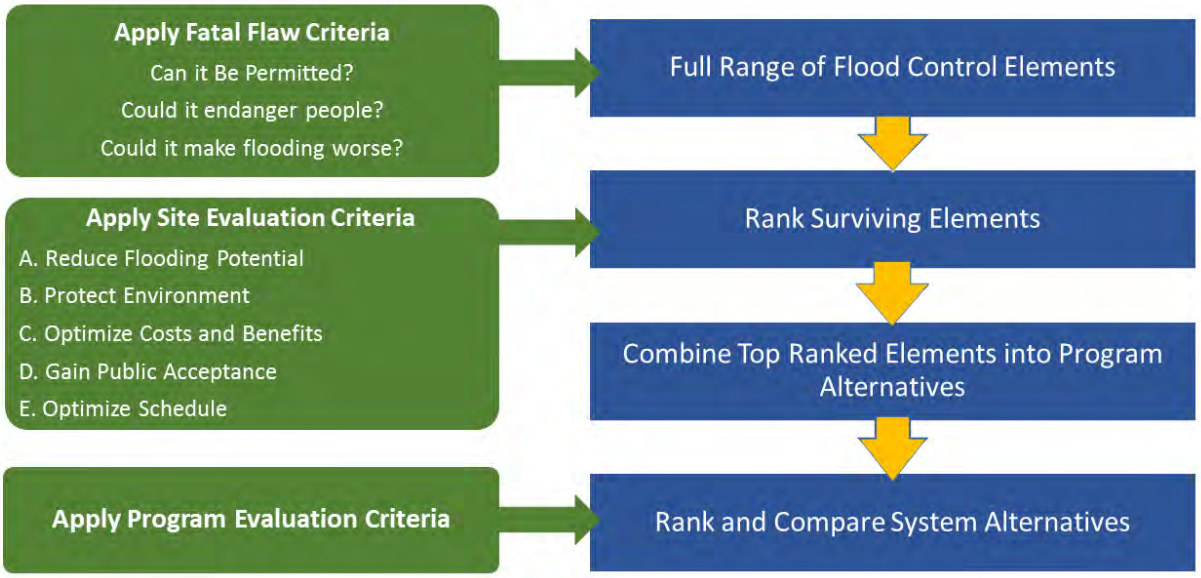

Figure 3-1. Alternatives Evaluation Process
Ross Valley Flood Protection and Watershed Program

A multi-attribute decision support tool was used to evaluate the 27 alternative flood reducing elements described in Section 2 and compare them to the five detention basin locations proposed in the CIP. The tool allows decision makers to evaluate how well each alternative performs compared to other alternatives for a given set of criteria. In this case, the evaluation criteria were developed based on the goals and objectives that were part of the original drainage fee ballot language, the overall Program goals and objectives, as well as addressing community concerns about potential local impacts.

As shown in Figure 3-1, there are three types of criteria: 1) Fatal Flaw, 2) Site Evaluation, 3) Program Evaluation. Fatal flaw criteria are used to screen out alternatives that for a specific reason cannot meet the project objectives and should not be carried forward into the remainder of the analysis. The site evaluation criteria are applied to measure the effectiveness of various attributes of specific sites which are then ranked based on their performance. Finally, the highest ranked sites are assembled into a range of Program Alternatives (different combinations of sites) and the Program evaluation criteria are applied to evaluate how the collection of sites work together to reduce flooding.

A brief description of the process used to evaluate the flood reducing elements is described in this section and shown in the flow chart above. The specific evaluation criteria used for this study, weighting and scoring of each alternative is described in Section 4, Criteria, Weighting, and Ranking of Project Elements.

3.1 Evaluation Categories and Criteria

The primary objectives of the Ross Valley Flood Protection and Watershed Program are listed in Section 1. These Program objectives were used to develop five categories for all the evaluation criteria and an average of three criteria for each category, for a total of 15 evaluation criteria as listed below.

- A. Reduce Flooding Potential in Ross Valley (3 criteria)
  - A1. Maximize Flow Reduction Benefit
  - A2. Maximize Community Benefit
  - A3. Avoid Flooding Downstream
- B. Protect Environment and Provide Environmental Enhancements (3 criteria)
  - B1. Minimize Environmental Impacts
  - B2. Maximize Environmental Enhancements
  - B3. Provides Ability to Obtain Permits
- C. Optimize Project Cost and Community Economic Costs (5 criteria)
  - C1. Minimize Local Economic Impacts
  - C2. Minimize Operation and Maintenance Requirements
  - C3. Maximize Construction Feasibility
  - C4. Minimize Project Cost
  - C5. Maximize Funding Opportunities
- D. Maximize Public Benefit and Minimize Public Impacts (3 criteria)
  - D1. Address Public Concerns
  - D2. Minimize Inconvenience to the Public – Permanent Project
  - D3. Minimize Inconvenience to the Public - Temporary
- E. Optimize the Implementation Schedule (1 criterion)
  - E1. Minimize Coordination/Schedule Requirements

We developed the evaluation criteria for each of these five categories based on meeting the objectives stated in the ballot language, the District's desire to leverage existing available grant funding opportunities, the public's desire to implement solutions that reduce flooding in Ross Valley as quickly as possible, and concerns raised by the public about conversion of existing sites into shared use detention basin facilities.

3.1.1 Weighting Multipliers

Weighting multipliers were developed for each category that are relative to the importance of each category in achieving the objectives of the Program. Recommended weighting multipliers for each of the five categories were presented to the TWG and the Board for approval. These category weightings are discussed in Section 4.2.

Within each category there was another weighting multiplier applied to each individual criterion that reflects the relative importance of each criterion towards meeting the goals of each category. The criteria weighting multipliers were developed by the consultant and presented to Marin County for approval before proceeding to the next step. Therefore, two weighting multipliers were applied to each criterion rating. One weighting multiplier was applied to each of the categories listed above and an additional weighting multiplier was applied to each individual criterion within each of the five categories. The criterion weighting multipliers were based on a scale of 2 through 5:

- Critical to success of the project = 5
- Very important to the success of the project =4
- Very important to consider =3
- Important to consider = 2

3.1.2 Rating System

For each individual criterion, several factors were identified that could be rated based on a qualitative and/or quantitative analysis. The process began by developing a rating system for the individual factors that ranged from 2-6 to normalize all the data. A rating of 2 was applied to the project element with the lowest rating or the worst condition and a rating of 6 was applied to the project element with the best rating and that most closely met the goals of each criteria. Elements in between were rated based on qualitative adjustments or in some cases a regression analysis (see Appendix A for details). The reason this scale of 2-6 was selected was because the best rating project element would only be 3 times better than the worst rated project element. If a scale from 1 to 10 had been used, the analysis would have indicated that the highest rated project element would be ten times better than the lowest performing project element; this would not accurately reflect the relative performance between project elements.

3.1.3 Fatal Flaws

In addition to the 2-6 rating system, a zero rating was applied to those flood reducing elements that were deemed to have a fatal flaw for any of three factors considered critical to the success of the Program. These three factors are:

- Flood Protection – Would alternative increase potential for flooding downstream?
- Public Safety Concern – Would alternative have the potential to trap people underground during a storm event?
- Environmental –Would permit approvals, necessary to build the project, likely be denied by resource agencies?

If the answer to any of these three questions was yes, then the flood reduction element was considered to have a fatal flaw and was rated a zero for this factor. Flood reduction elements that were considered to have a fatal flaw were eliminated from further analysis. The flood reducing elements that survived the fatal flaw analysis were then rated for each of the factors identified in Table 4-1, Criteria and Factors Used for the Ross Valley Flow Reduction Study, presented in Section 4.1.

3.1.4 Calculations

The rating for each factor was assigned (2-6 as described above) and then all the factor ratings were averaged for each one of the 15 criteria for all 32 flood reducing elements including the current CIP Program Alternatives. Utilizing this approach of averaging the ratings allowed multiple factors to be assessed for each of the 15 criteria while avoiding any one criterion being weighted too heavily in the final scoring due to a larger number of factors being considered. An example of this calculation for a criterion with three identified factors is provided below.

(Factor 1 Rating + Factor 2 Rating+ Factor 3 Rating)/3 = Criterion 1 Rating

Criterion 1 Rating x Criterion 1 Weighting Multiplier x Category 1 Weighting Multiplier = Criterion Score

The evaluation factors, criteria and categories and proposed weighting were presented to the TWG on February 26, 2015. After receiving TWG comments on the proposed evaluation criteria and evaluation process approach, minor modifications were made and the final approach was presented to the Flood Advisory Board on March 17, 2015.

3.2 Scoring and Ranking Approach

A criterion rating was calculated for each of the 15 criteria for each of the 27 flood reducing elements and compared to the criteria ratings for the five detention basins identified as the Baseline Measures in the CIP. Criteria scores for each of the 27 flood reducing elements were summed to develop a total

score for each flood reducing element. Three project elements were eliminated from further discussion due to fatal flaws for the reasons described above.

The total score for each of the surviving project elements was then compared to the total scores for the five original detention basins in the CIP and the results were shared with the TWG on March 26, 2015. After incorporating comments from the TWG, minor adjustments were made to the final scores based on updating the ratings to reflect the most current information and interpretation of the proposed elements. All 27 of the flood reducing elements and original five detention basins were ranked from highest score to lowest score and presented to the Board on April 16, 2015 for further discussion. The specific ratings for each factor, averaged criteria rating, and proposed criteria weighting for each of the 27 flood reducing elements and the original five detention basins are presented in Appendix A. The criteria scores and total scores for each of the 27 flood reducing elements and original 5 detention basins are summarized in Section 4.

SECTION 4

Criteria, Weighting, and Ranking of Project Elements

This section describes each of the criteria and the factors used to develop the criteria ratings for each of the flood reduction elements and includes a summary table of the total scores for each of the individual flood reducing elements and the original 5 detention basins studied.

4.1 Evaluation Criteria

The evaluation criteria fall into five major categories, designated A through E in Table 4-1. To apply each of the criteria, a number of specific factors are shown beneath each criterion listed in the table. In total there were ratings developed for 50 factors. Table 4-1 show which factors were applied in the fatal flaw screening analysis, the preliminary site (flow reducing element) evaluation analysis, and the final Program Alternative evaluation process.

Table 4-1. Criteria and Factors Used for the Ross Valley Flow Reduction Study
Ross Valley Flood Protection and Watershed Program

Criteria • **Factors Contributing to Criteria Rating**	**Fatal Flaw**	**Site Evaluation**	**Program Evaluation**
A. Reduce Flooding Potential in Ross Valley			
A1. Maximize Flow Reduction Benefit			
• Acre-feet of Flow Reduction Potential		X	X
• Peak Flow at Three Target Locations (average of 3)			X
• Reduce Flooding Potential Downstream of Ross			X
• Frequency of Flooding Reduced			X
A2. Maximize Community Benefit			
• Homes Removed from Floodplain			X
• Improve Emergency Access Routes			X
• Minimize Inland Flooding on Surface Streets			X
A3. Avoid Flooding Downstream			
• Project Increases Flooding Downstream of Ross	Fatal Flaw		
B. Protect Environment/ Provide Environmental Enhancement			
B1. Minimize Environmental Impacts			
• Potential to Increase Sediment Deposits Downstream		X	X
• Inundation of Sensitive Habitat		X	X
• Impacts to Endangered Species		X	X
• Impacts to Fish Migration/Spawning Habitat		X	X

Table 4-1. Criteria and Factors Used for the Ross Valley Flow Reduction Study
Ross Valley Flood Protection and Watershed Program

Criteria • **Factors Contributing to Criteria Rating**	Fatal Flaw	Site Evaluation	Program Evaluation
• Native Vegetation Removal		X	X
• Tree Removal within the Creek		X	X
• Concrete Lining Prevent Groundwater Recharge		X	X
B2. Maximize Environmental Enhancements			
• Wetland Creation/Protection		X	X
• Stream Restoration Potential		X	X
B3. Provides Ability to Obtain Permits			
• Ability to Gain Permit Approvals	Fatal Flaw		
C. Optimize Project Costs and Community Economic Costs			
C1. Minimize Local Economic Impacts			
• Impacts to Businesses		X	X
• Closure of Parks and Baseball Fields		X	X
• Impacts to Recent Park Improvements		X	X
C2. Minimize Operation and Maintenance Requirements			
• Passive vs. Active Operation		X	X
• Require Pump Operations		X	X
• Long Term Operation and Maintenance		X	X
• Time to Restore Facility to Working Order		X	X
C3. Maximize Construction Feasibility			
• Construction Accessibility		X	X
• Restricted Working Windows During Year		X	X
• Proximity of Temporary Staging Areas		X	X
C4. Minimize Project Cost		X	
• Construction Cost		X	X
• Right of Way Acquisition		X	X
C5. Maximize Funding Opportunities			
• Conforms to Current/Near-Term Grant Opportunities		X	X
• Flood Zone 9 Fee Eligibility		X	X

Table 4-1. Criteria and Factors Used for the Ross Valley Flow Reduction Study
Ross Valley Flood Protection and Watershed Program

Criteria • **Factors Contributing to Criteria Rating**	**Fatal Flaw**	**Site Evaluation**	**Program Evaluation**
D. Maximize Public Benefit/ Minimize Public Impacts			
D1. Address Public Concerns			
• Public Safety – proximity to schools/parks		X	X
• Public Safety - potential to trap people	Fatal Flaw		
• Maximize Opportunities for Recreational Enhancements (parks and river trails)		X	X
• Visibility and Aesthetics – Maintain Quality of Life (private residential properties adjacent to site)		X	X
• Potential to Improve Condition of Parks		X	X
D2. Minimize Inconvenience to the Public – Permanent Project			
• Permanent Loss of Parking		X	X
• Permanent Negative Change to Character/Use of Site		X	X
• Negative Impacts to Critical Facilities (Emergency Response): Fire, Police, Hospitals, Town Hall		X	X
D3. Minimize Inconvenience to the Public - Temporary			
• Facility Use During Construction		X	X
• Construction Noise/Dust Impacts for Adjacent Residents		X	X
• Traffic Disruption and Noise from Truck Trips through Residential Areas		X	X
E. Optimize Implementation Schedule			
E1. Minimize Coordination Schedule/Requirements			
• Permanently Require Change in Land Use		X	X
• School District Coordination Required		X	X
• Division of Dam Coordination Required		X	X
• Resources Agency Approval Required		X	X
• Private Owner Coordination Required		X	X

As described in Section 3, a rating was applied for each of the factors listed above for each flow reducing element.

Ratings were assigned based on a combination of available information, developed information (conceptual drawings were prepared to estimate the potential storage capacity of detention basins), and professional judgment. For example, assumptions were made about the size, storage potential, and costs of bypass conduits and the Pine Mountain Tunnel. Simplifying assumptions were used to calculate

the potential number of truck trips for transporting material for a given storage volume, and cost estimates were developed based on simplifying assumptions from cost data available from previous studies and experience. Based on these calculations and familiarity with actual site conditions, each flood reducing element was rated for all 50 factors.

Assumptions were also made for the size and length of the bypass alternatives based on width of existing street and potential presence of existing utilities in the downtown area. As discussed above, the bypass alternatives were evaluated two different ways: 1) as a bypass increasing conveyance capacity, and 2) as an underground detention basin. For option 1, the bypass structures reduce localized flooding and shift flooding downstream but do not significantly reduce the flow volume downstream in San Anselmo Creek and Corte Madera Creek. For option 2, the potential storage volume of each bypass was estimated based on the size and length of the proposed bypass culvert. It was assumed that approximately 50 percent of this calculated storage could be used due to the need for multiple gates, and to account for potential sedimentation and debris blockage. Based on these assumptions, the potential storage volume was calculated for each of the bypass culverts. Approximately 4 acre-feet of peak flow would be detained for each proposed bypass culvert.

Flood elements that detained less than 10 acre-feet of peak flow were rated a zero for flow reduction. The amount of peak flow detained was so small for such a large infrastructure cost (benefit to cost ratio) that these alternatives were not considered feasible to construct. All of the flood reducing elements listed in Section 2 were carried forward, rated and scored. However, only the flow reducing elements that detained at least 10 acre-feet of peak flow scored high enough to move forward into the Program Alternative phase.

4.2 Weighting

Weighting multipliers were developed for each of the five categories listed below.

- A. Reduce Flooding Potential in Ross Valley (weighted a 5)
- B. Protect Environment and Provide Environmental Enhancements (weighted a 4)
- C. Optimize Project Cost and Community Economic Costs (weighted a 3)
- D. Maximize Public Benefit and Minimize Public Impacts (weighted a 3)
- E. Optimize the Implementation Schedule (weighted a 2)

The assignment of weighting multipliers is standard practice in this type of multi-attribute decision support process. These particular weighting multipliers are based on objectives of the program as expressed in the CIP and in the original drainage fee ballot language. The first category listed, “Reduce Flooding Potential in Ross Valley,” reflects the primary program objective to “reduce the frequency and severity of flooding in Ross Valley.” Therefore, this category was weighted as critical to the success of the Program and was given the highest weighting of 5.

Protection of the environment is a secondary goal of the Program. Projects that are protective of the environment or enhance the environment, such as identifying opportunities to “daylight” streams (i.e., restore a stream that had been diverted belowground in a culvert back to a more natural open channel), are very important to the success of the Program. For this reason all criteria in this “Protect Environment and Provide Environmental Enhancements” category received a weighting of 4.

The total available funding for the Program from drainage fees is limited and so the District and other Program sponsors must leverage the drainage fees and identify and seek matching grant funds. It is very important to assure that project costs are in alignment with the overall Program goals and the District is able to fund the proposed project elements. Therefore, the “Optimize Project Cost and Community Economic Costs” category of criteria was given a rating of a 3.

Equally important as the overall Program costs is the effect on the community. There are project benefits but there are also temporary impacts that will disrupt the community during construction. Most

of these effects would be temporary and ultimately yield a permanent benefit to the community. Without community support to move forward projects can stall and languish in the courts and never be implemented. With this understanding, a weighting of 3 was assigned to the Maximize Public Benefit and Minimize Public Impacts category.

Finally, the "Optimize the Implementation Schedule" category was given a 2 rating as an important factor to consider. It is acknowledged that all stakeholders are invested and focused on providing flood relief in Ross Valley sooner rather than later. However, it is important not to eliminate flow reducing elements that perform well in every other way because they may require a longer time to implement to coordinate with the Division of Safety of Dams or resource agencies.

As described in Section 3.1.1, a second set of weighting multipliers were applied for each criterion within each category using a similar process. There have been questions from the Board and members of the public about eliminating the weighting altogether and treating all criteria with equal weight, but that would result in a ranking result that gives the same weight to temporary construction impacts as it does to permanent outcomes, like providing for public safety or meeting the goal of flood protection. Applying weighting multipliers reflects the relative importance of each criterion to the Program sponsors and the community. The weighting multipliers used for each of the criteria within each category are contained in the spreadsheets in Appendix A.

When using a multi-attribute decision support tool such as the one used here, the project sponsor may want to perform a sensitivity analysis to alter the criteria weighting to understand how the final scoring may be affected. However, for this program it is anticipated that modifying the weighting would result in minor shifting in the overall scores and ranking and the best performing flow reducing elements would remain the same with perhaps a slight change in order. This decision support tool is used to eliminate the poorly performing elements from further consideration and focus decision makers on the best performing elements so that they can focus on balancing the competing priorities for a project.

4.3 Ranking

Using the calculations shown in Section 3, Evaluation Process, a criteria score was developed for each flow reducing element. These scores were summed together to calculate a total score for each of the flow reducing elements. The elements were then ranked in order from the highest scoring element (element that best reduces flows in Corte Madera Creek and achieves other goals of the Program) to the lowest scoring element (does not meet the overall goals of flow reduction and other goals of the Program).

Program elements that have a low score should not be entirely dismissed. There are some very low cost measures such as implementing LID measures on future development that can be implemented as a part of the overall Program. There may be elements that reduce localized flooding, such as bypass conduits, that the Program sponsors may want to consider in future phases after the 10-Year Work Plan is implemented in lieu of removing building structures in the creek, constructing flood walls, or other channel capacity enhancement projects. These flood reducing elements and their relative performance have been documented for future reference. A summary of the total scores for each flood reducing element and the score for each individual evaluation criterion can be found in Appendix B.

The total score and ranking of each of the flow reducing elements are shown in Table 4-2.

As shown in Table 4-2, Phoenix Lake is the highest performing element by 90 points, a significant amount. One of the highest performing elements is Memorial Park. Both of these sites were included in the original Baseline Measures of the CIP and this analysis confirms that these two sites should continue to move forward for further evaluation and implementation. The next highest scores were for Deer Park, the nursery site in Baywood Canyon, and Camp Bothin. These sites provide detention above the

Table 4-2. Summary of Application of Fatal Flaw and Site Evaluation Criteria to Potential Ross Valley Flow Reduction Elements

Ross Valley Flood Protection and Watershed Program

Flow Reduction Element	Eliminated Due to Fatal Flaw	Ranking from Site Evaluation	Total Score from Site Evaluation
Alternative Conveyance			
A. Channel Widening through San Anselmo		22	485
B1. Bypass Conduit through San Anselmo along Cedar Street		24	483
B2. Bypass Conduit through San Anselmo along San Anselmo Avenue		23	484
C. Bypass Conduit through Ross		26	474
D. Bypass Conduit through Fairfax		25	476
E. Setback levels at A.E. Kent Middle School		31	379
F. Setback Levees at Hal Brown Park at Creekside		30	408
G. Utilize surface streets for conveyance		27	467
Sound Development Practices			
H. Purchase and removal of flood prone properties		28	462
I. Flood proofing		21	500
J. Implement Low Impact Development provisions		19	517
Other Storage Ideas			
K. Underground Parking detention	X	N/A	N/A
Detention Basins			
Fairfax Creek Watershed Upstream of Fairfax Town Hall			
L. Camp Bothin Youth Center		6	571
M. Nursery near Baywood Canyon Drive and SFD Blvd		4	614
N. Manor Elementary School		11	557
Sleepy Hollow Creek Watershed above Sycamore Bridge in San Anselmo			
O. Hidden Valley Elementary School		10	559
P. Brookside Elementary School		12	555
Q1. San Domenico School Upstream		7	571
Q2. San Domenico Ball Field		15	546
San Anselmo Creek Watershed above Sycamore Bridge in San Anselmo			
R. Deer Park		3	616
S. Marin Stables (Woodland Horse Stables)		13	553
T. Pine Mountain Tunnel		18	520
U. Detention Facilities Along Cascade Creek	X	N/A	N/A

Table 4-2. Summary of Application of Fatal Flaw and Site Evaluation Criteria to Potential Ross Valley Flow Reduction Elements

Ross Valley Flood Protection and Watershed Program

Flow Reduction Element	Eliminated Due to Fatal Flaw	Ranking from Site Evaluation	Total Score from Site Evaluation
V. Camp Tamarancho Lake		17	528
W1. Marin Town and Country Club Detention Pond		8	563
W2. Marin Town and Country Club Cistern (underground storage)	X	N/A	N/A
W3. Marin Town and Country Club Underground Parking/Storage	X	N/A	N/A
Original Program Sites			
1. Loma Alta		14	551
2. Lefty Gomez Field		5	576
3. Memorial Park		2	654
4. Phoenix Lake		1	711
5. Red Hill		9	562

Notes:

Any potential alternative on private property that is pursued will necessitate negotiations with the landowner to obtain an easement or similar right enabling the project to be built and maintained. There are no plans, and none is expected, to exercise eminent domain powers in connection with any of the alternatives described herein.

Conceptual drawings were prepared to estimate the potential storage capacity of detention basins (see Appendix C). Assumptions were made about the size, storage potential, and costs of bypass culverts and the Mountain Lake Tunnel. Simplifying assumptions were used to calculate the potential number of truck trips for a given storage volume and cost estimates were developed based on simplifying assumptions from cost data available from previous studies and experience. Based on these calculations and familiarity with actual site conditions, each flood reducing element was rated for all 50 factors. The cost estimates used for this analysis are presented in Appendix D.

Some of the factors were not measured until after Program Alternatives (combination of various flow reducing elements) were developed as shown in the flow chart Figure 3-1. For example, hydraulic modelling on the combined flow reducing elements (Program Alternatives) was necessary before ratings could be developed for some of the factors listed under category A, Reduce Flooding Potential in Ross Valley.

Sycamore Bridge location in the Town of San Anselmo and reduce the flows downstream. However, Camp Bothin and the nursery site are currently privately held. Further evaluation will be needed to determine if the District can secure flood easements for these properties before they can be implemented. Deer Park is owned by the Ross Valley School District.

Another site that performed well is the San Domenico School site along Sleepy Hollow Creek. This site is located upstream of San Anselmo and would provide detention and flow reduction needed to meet the San Anselmo flow target, as does Memorial Park. If this site were to be implemented, it may also reduce flooding along Sleepy Hollow Creek without having to implement channel improvement measures that are identified in the CIP. This site warrants further investigation. If detention was exclusively provided along Sleepy Hollow Creek instead of Memorial Park, the Town of San Anselmo would lose the opportunity to provide needed upgrades and repairs to Memorial Park. This approach would also forfeit the opportunity to daylight Sorich Creek and return it to a more natural functioning stream providing environmental benefits, consistent with overall program objectives. The San Domenico School property is also privately held outside of Town of San Anselmo jurisdiction and within an unincorporated area of Marin County. If this site were to be carried forward, an evaluation of who would be the lead agency

would be required (i.e., would the District take the lead, or would the Town of San Anselmo consider expanding their sphere of influence and annexing the property?). The Town of San Anselmo has secured grant funds for Memorial Park from the State of California; however, the State has indicated that those funds could be transferred to another site that meets the same objectives of providing flood protection within San Anselmo.

There are also two school sites located adjacent to Sleepy Hollow Creek that performed well: Brookside Elementary and Hidden Valley Elementary School. These sites are smaller than other sites, would require construction on school property, and would require approval and coordination with the school district. Parents may have concerns regarding locating detention upstream of school sites and disruption of school activities. However, there may be opportunities to re-construct these fields and use them in combination with detention at Memorial Park. These school sites may allow the Town of San Anselmo to reduce the size of the detention basin at Memorial Park and provide new improved fields at these two schools while increasing the availability of ball fields available for the public to use.

Three of the original Baseline Measure detention basin sites (Lefty Gomez Field, Red Hill, and Loma Alta) are also among the top performing elements. These sites also provide a very good option for moving forward.

The Marin Town and Country Club detention pond element has the potential to detain a large quantity of storm runoff. However, this would most likely require a full purchase of the property and relocation of several residents and structures. The current land owner has other development plans and is unwilling to sell this property; therefore condemnation would likely be required. As there are other flow reducing elements that can achieve the required target flows and the use of the eminent domain process would be costly and time-consuming, this element was not carried into the Program Alternatives.

The next step in the analysis is to group the best performing elements into Program Alternatives and run the hydraulic model to evaluate how well the Program Alternatives meet the goal of reducing the flows within the Ross Valley watershed at three targeted locations. This analysis is discussed further in Section 5, Flow Reduction Program Alternatives.

A note about scoring: The scoring and ranking process is intended as a tool to support decision-makers in the evaluation of the alternative flood reducing elements. Every effort was made to incorporate multiple factors into the tool to fully inform decision-makers. However, when further analysis is completed and more information is available regarding specific sites, their availability, or potential hidden costs, decision makers may choose to implement certain elements for reasons that cannot be captured in this analysis. This tool allows decision makers to focus their attention on pursuing the best alternatives.

SECTION 5

Flow Reduction Program Alternatives

Three Program Alternatives were developed from the best performing flow reducing elements as described below and were compared to the baseline CIP Project.

5.1 Developing Program Alternatives

The highest ranked flow reducing elements, as described in Section 4, were combined to develop three Program Alternatives in addition to the current Program included in the CIP. The Program Alternatives were developed to meet the following criteria:

- Include the top ranked detention basin sites
- Distribute flow detention upstream of key flooding locations throughout the watershed for all three Towns:
  - Fairfax
  - San Anselmo
  - Ross
- Meet flow targets throughout the basin:
  - Maximum 100 year flow of 1,100 cubic feet per second (cfs) at the Fairfax Town Hall
  - Maximum 100 year flow of 4,540 cfs at Sycamore Bridge in San Anselmo
  - Maximum 100 year flow of 5,540 cfs at the U.S. Geological Survey (USGS) Gage at Ross.

The flow rate targets are shown on Figure 5-1. These targets were identified during the development of the CIP and reflect the maximum flow rate allowed at each location to achieve containment of the anticipated flow from a 100-year storm event in downstream sections of the channel after all the channel improvements in the CIP are also constructed. The ability to meet these flow rates drives how the individual flow reducing elements are combined into each of the three Program Alternatives.

The downstream flow rate of 5,540 cfs at the USGS Ross Gage matches the proposed design flow rate for the USACE Unit 4 project on Corte Madera Creek.

The five detention basins identified in the original CIP detain a total of 480 acre-feet. Each of the three Program Alternatives has to meet the target flow rates at the three locations listed above and have a total storage capacity greater than the 480 acre-feet provided by the CIP. The target for total storage volume in the Program Alternatives was actually set at a minimum of 550 acre-feet to allow flexibility in the sizing and operation of the systems. If the total storage capacity exceeds the minimum requirements, there may be opportunities to reduce the number and cost of the proposed channel improvements, or modify the size of proposed detention facilities, during future phases of the Program.

To assemble the Program Alternatives, assumptions were made about the sizing and siting (within parcels) of the top ranked detention basin sites. The detention basin sites were located in areas that minimized impacts to adjacent residents and existing structures. The potential size of each detention basin facility was based on the available open area, potential depth of impoundment, and contribution of anticipated runoff that is expected in each area based on the hydrologic models. Given these conditions, conceptual designs were developed for the eleven highest ranked flow reducing elements. The conceptual designs and approximate location of each proposed detention basin site are included in Appendix C as a reference.

In addition to the five original detention basin sites identified in the CIP, three new Program Alternatives were developed based on the highest ranked flow reducing elements. The flow reducing elements were

grouped by watershed. The combination of the flow reducing elements, ranking, size, and watershed location for the CIP and three Program Alternatives are shown in Table 5-1.

Each of the three Program Alternatives addresses different program concerns so decision makers can evaluate the relative benefits and approximate costs of each Program Alternative as compared to the CIP.

Table 5-1. Proposed Program Alternatives
Ross Valley Flood Protection and Watershed Program

Detention Basins By Ranking Within Watersheds	Ranking By Watershed	Storage Capacity (acre-feet)	CIP	Alt. 1	Alt. 2	Alt. 3
			Current Program	Highest Ranking Element in Each Watershed	Sleepy Hollow Option	Most Environ-mentally Friendly
Fairfax Creek Watershed above Fairfax Town Hall						
Camp Bothin Youth Center	6	60		X	X	
Nursery near Baywood Canyon Drive and SFD	4	88		X	X	X
Lefty Gomez Field	5	96	X			X
Loma Alta	14	27	X			
Sleepy Hollow Creek Watershed above Sycamore Bridge						
Upstream of the San Domenico School	7	102			X	
Hidden Valley Elementary School	10	33				
Brookside Elementary School	12	18.5				
San Anselmo Creek Watershed above Sycamore Bridge						
Deer Park	3	89		X	X	X
Memorial Park	2	84	X	X		X
Red Hill Park	9	29	X			
Ross Creek above Ross USGS Gage						
Phoenix Lake	1	244	X	X	X	X
Total Potential Storage Capacity of Alternatives						
(Target storage capacity >550 acre-feet [ac-ft] of storage)			480 ac-ft	565 ac-ft	583 ac-ft	601 ac-ft
Sound Development Practices For All Program Alternatives						
Flood Proofing				X	X	X
LID Development				X	X	X
Purchase and Removal of High Priority Flood Prone Properties				X	X	X
Creek Improvement Measures			X	X	X	X

FAIRFAX TOWN HALL
Required 100 Year Flow Reduction = 450 cfs
Target 100 Year Flow Rate = 1,110 cfs

SYCAMORE BRIDGE, SAN ANSELMO
Required 100 Year Flow Reduction = 710 cfs
Target 100 Year Flow Rate = 4,540 cfs

USGS ROSS GAGE
Required 100 Year Flow Reduction = 1,350 cfs
Target 100 Year Flow Rate = 5,540 cfs

LEGEND

Target Flow Locations

Project Area

Ross Valley Flow Paths

Stream Type

- Stream / River
- Pipeline; Underground Conduit
- Primary Limited Access or Interstate
- Primary US and State Highways
- Secondary State and County Highway
- Freeway ramp
- Ramp, other
- Local or Rural Road
- Traffic circle or Cul-de-sac
- Alley, driveway or service road
- 4WD
- Pedestrian way
- Ferry

Community Name

- Corte Madera
- Fairfax
- Larkspur
- Mill Valley
- Ross
- San Anselmo
- San Rafael

N

0 450 900 1,800 2,700 3,600 Feet

FIGURE 5-1
Flow Reduction Targets in Ross Valley
Ross Valley Flood Protection and Watershed Program

5.2 Evaluation of Program Alternatives

The Program Alternatives were modeled using the USACE's HEC-HMS hydrologic/hydraulic basin model as described in the technical memorandum titled *HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M HILL*,[2] included as Appendix E. This model was calibrated to reflect the December 31, 2005 storm event which is considered to be the one percent storm event. Each detention basin was modeled independently to refine the conceptual design. The sites were then combined and modeled to evaluate their combined effectiveness in reducing the peak flow at the three flow reduction target locations. The resulting residual 100-year flow results at each of the three locations for the Baseline Measures and three Program Alternatives are shown in Table 5-2.

Table 5-2. Hydrologic Analysis – Residual 100-Year Flow Results
Ross Valley Flood Protection and Watershed Program

Key Breakout Location	Target Flow (Maximum Allowable Flow Based on CIP) (cfs)	Estimated Peak Fow		
		Alternative 1: Highest Ranked Elements (cfs)	Alternative 2: Sleepy Hollow Option (cfs)	Alternative 3: Most Environ. Friendly (cfs)
Downstream End of Fairfax Town Hall	1,110	1,170	1,170	1,010
San Anselmo Creek above Sycamore Bridge	4,540	4,470	4,470	4,310
USGS Ross Gage	5,540	5,460	5,450	5,310

Source:
HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M HILL (Stetson 2015; see Appendix E)

Program Alternative performance against the target flow rates was measured under Criterion A1, Maximize Flood Reduction Benefit and rated accordingly. The anticipated peak 100-year flow volumes were calculated at each of the three key breakout locations shown in Table 5-2.

Using a regression analysis the flow rates were normalized and assigned a rating score between 2 and 6. As described previously, the ratings for each factor were then averaged to develop a rating for the A1 Maximize Flow Reduction Benefit hydraulic criterion at the Program Alternative level.

Each of the Program Alternatives were then rated and scored using the same evaluation criteria that were used for the individual flow reducing elements. The criteria ratings for each individual flood reducing element were averaged to develop a criteria rating for each of the combined Program Alternatives. The weighting multipliers were applied and new scores were developed for each evaluation criterion. An example of these calculations to calculate a new rating for each Program Alternative for Criterion A1 is shown below.

(Element 1 Criterion A1 rating + Element 2 Criterion A1 rating + Element 3 Criterion A1 rating + Element 4 Criterion A1 rating + Element 5 Criterion A1 rating)/5 = the Program Alternative rating for Criterion A1.

Program Alternative Criterion A1 rating x Criterion A1 weighting x Category A weighting = Program Alternative Criterion A1 score

[2] Stetson Engineers, Inc. 2015. *HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M HILL.* May 13.

The criteria scores for the three Program Alternatives were evaluated and compared against the original proposed detention basin sites identified in the current CIP. The total score (sum of all the criteria scores) for the current CIP and the three Program Alternatives are shown in Table 5-3.

As shown in Table 5-3, the highest scoring alternative is Alternative 3 – The Environmental Alternative (the most environmentally friendly option). Alternative 3 scored the highest because it had the highest score for Category 1, Reduce Flooding Potential, and Category 2, Protect Environment.

Table 5-3. Draft Ranking of AlternativesRoss Valley Flood Protection and Watershed Program
Ross Valley Flood Protection and Watershed Program

Evaluation Category	Current CIP Alternative	Alternative 1 Highest Ranking Elements in Each Watershed	Alternative 2 Sleepy Hollow Option	Alternative 3 Most Environ. Friendly
A. Reduce Flooding Potential in Ross Valley	373	393	389	420
B. Protect and Enhance Environment	212	221	209	222
C. Optimize Project and Community Economic Costs	196	198	192	197
D. Maximize Public Benefit/ Minimize Public Impacts	106	112	114	111
E. Optimize Implementation Schedule	17	16	15	16
Totals	**904**	**941**	**919**	**966**
Ranking*	**4**	**2**	**3**	**1**

Note:
* Ranking subject to change based on ongoing conceptual design

The combination of detention basins included in Alternative 3 have the largest potential storage capacity as shown in Table 5-1 (601 acre-feet). A larger volume of detention reduces the peak flow at each of the three key breakout locations as well. Therefore, this Alternative performed the best for the A1 criterion, Maximize Flow Reduction Benefits. This combination of basins also avoided placement of detention facilities in open spaces and reserves. Therefore, Alternative 3 also scored the highest for criterion B3, Provides Ability to Obtain Permit Approval. Both criteria A1 and B3 were highly weighted in the analysis, and therefore this alternative scored the highest.

The Current CIP Alternative scored the lowest of the four alternatives studied. However, this is primarily due to the fact that it also scored the lowest on hydraulic performance because it detained the least amount of flow of the four alternatives studied. If the detention basin sizes were increased to detain comparable amounts of flow, then the Current CIP Alternative would have a similar score to Alternative 3.

Another reason that Alternative 3 – The Environmental Alternative scored better than the Current CIP Alternative is that the latter includes construction of a detention basin within the Loma Alta protected open space. This resulted in a lower score for the environmental criteria which was also highly weighted.

The Current CIP Alternative does not require the purchase of private property. Therefore, the score for the cost and schedule to implement is much lower for Alternative 3 as compared to the Current CIP Alternative.

Alternative 2 – The Sleepy Hollow Option performs better than the Current CIP Alternative because it detains more peak storm flows and provides greater flow reduction at the Ross Creek USGS Gage, but not as much as Alternative 3 – The Environmental Alternative. However, as discussed above, if the size of the basins were increased to store the same amount of peak storm flows, the scores will likely be more similar. Alternative 2 replaces the Memorial Park detention basin site with the San Domenico School detention basin site. If the San Domenico School site could be acquired for use as a detention facility, there is a potential benefit of reducing flows along Sleepy Hollow Creek as part of the first phase of improvements instead of waiting to construct channel improvements at a later date. This may provide a more immediate benefit to properties subject to flooding in this area. However, the entire operation of the system and when to employ each detention basin would also have to be evaluated to make sure that the water surface through downtown San Anselmo could be attenuated quickly using a detention basin that is so far upstream. There is also the disadvantage to this Alternative in that if Memorial Park is not included in the program, the Town would not be able to apply the available grant funds to make needed repairs and upgrades to the park.

5.3 Conclusions

Based on the hydraulic analysis of the current CIP Alternative and three Program Alternatives, we confirmed that all four combinations of flow reducing elements will meet flow targets at the Sycamore Bridge in San Anselmo and the USGS Gage in Ross. Minor adjustments to the proposed channel improvements and basin sizes during the design development phase could make up the difference to achieve the flow target at Fairfax Town Hall.

The detention basin site common to all Alternatives is the Phoenix Lake detention site. This flow reducing element was the highest ranked detention basin site and should be considered a part of the solution for all the combined Alternatives moving forward. However, Phoenix Lake can only solve part of the flooding issues that Ross Valley experiences. Due to its location, it provides no flow reduction to areas upstream of the Ross Creek confluence point in the Town of Ross. Therefore, the Program sponsors need to consider a combination of additional detention sites to satisfy the program goals and objectives.

The Program sponsors have some flexibility in deciding which Alternatives to move forward through the environmental process. It is also important to note that these four Program Alternatives are not the only possible combinations of detention sites that could be implemented to meet Program objectives. It's clear from the analysis that there are multiple combinations of the top ranking sites that meet the target flow rates at each of the three locations. While this analysis used all available information to make a determination about the relative feasibility of implementing the considered flow reduction elements, the reality is that uncertainties remain. The differences in ratings, while observable, are not significant when these uncertainties are taking into consideration. Uncertainties are always anticipated for any project and often include unforeseen or currently unknowable costs, permitting challenges, and local opposition.

SECTION 6

Recommendations

6.1 Summary

The primary purpose of this study was to determine if there are other flow reduction elements or detention basin sites that meet a new set of selection criteria better than any or all of the five detention basin sites identified in the CIP.

The study identified 27 new flow reduction elements and compared these elements against the original five detention basins utilizing a multi-attribute decision making process. This process included assessing the performance of all 32 flow reducing elements (27 new elements plus five original detention basin sites) in five major categories and a total of 15 evaluation criteria. The scores for the 15 evaluation criteria were developed by reviewing 50 different factors for each of the 32 flow reducing elements. A total of nine detention basin sites (including the original 5 sites) were combined to define three new Program Alternatives. The original hydraulic model was modified to evaluate how each of the Program Alternatives achieved the goal of reducing the peak flow. The three Program Alternatives were compared to the current CIP and ranked according to total score for the sum of all 15 of the evaluation criteria.

6.2 Recommendations

Originally the District envisioned that this study would result in recommending a finite set of sites to confirm or replace the five detention basin sites identified in the CIP. The District had originally planned to move forward with one preferred combination of sites for evaluation in the Programmatic Environmental Impact Report (PEIR). However, in the Draft version of this Flow Reduction Study Report it was recommended that the District maintain flexibility in moving forward with multiple combinations of flow reducing elements rather than identifying one preferred alternative with only one combination of flow reducing elements in the PEIR. Under this approach, it was recommended that the District also adopt an Implementation Strategy to prioritize a subset of the sites for development. Both the recommended PEIR Strategy and the Implementation Strategy are described below.In this Final version of the Flow Reduction Study Report, the PEIR Strategy and the Implementation Strategy described below remain the same except for some changes to the recommended detention basin sites, as summarized in Section 6.3, Next Steps.

6.2.1 PEIR Strategy

Under the recommended PEIR strategy, a group of sites immediately upstream of each of the three flow target locations (in Fairfax, San Anselmo, and Ross) would be carried forward for evaluation in the PEIR as shown in Table 6-1 below. It is anticipated that in the PEIR these sites would be ranked in terms of their priority for implementation within the subwatersheds, based on the application of the evaluation criteria and findings of this study.

The reasons and benefits for this recommended approach are as follows:

- Avoids taking viable sites off the table now in the event that sites with the highest rankings prove to be difficult to implement for various reasons (property acquisition or other costs, difficulty obtaining permits, etc.).
- Gives the lead agency (District or Town) flexibility to work with owners of the facility or facilities that work best for their community.

- Avoids having to go through a costly and time-consuming process to amend the PEIR if sites not included in the PEIR are determined to be the best approach in the future, in the event that sites with the highest ranking prove too difficult to implement.

Table 6-1. Detention Basin Sites Originally Recommended for Inclusion in the PEIR in the Draft Report
Ross Valley Flood Protection and Watershed Program

Target Flow Locations	Ranking Within Sub-Watershed	Detention Basin Sites	Ownership	Jurisdiction Location
Downstream End of Fairfax Town Hall	1	Former Nursery Site	Private	Unincorporated County of Marin
	2	Lefty Gomez Field	Ross Valley School District	Town of Fairfax
	3	Camp Bothin Youth Center	Private	Unincorporated County of Marin
	4	Loma Alta Open Space	Marin County Open Space District	Unincorporated County of Marin
San Anselmo Creek above Sycamore Bridge	1	Memorial Park	Town of San Anselmo	Town of San Anselmo
	2	Deer Park	Ross Valley School District	Town of Fairfax
	3	San Domenico School	Private	Unincorporated County of Marin
	4	Red Hill Park	Tamalpais Union High School District	Town of San Anselmo
USGS Ross Gage	1	Phoenix Lake	Marin Municipal Water District	Unincorporated County of Marin

Note:
The County and the Town may wish to consider also preserving the option in the PEIR to pursue the two additional sites in Sleepy Hollow Creek: Hidden Valley Elementary School and Brookside Elementary School.

Under this strategy, the PEIR would include all nine sites as potential future detention basin sites. The PEIR would define the Program as requiring a combination of flood reduction strategies, including bridge replacements, detention basin sites, and creek measures to meet the target flows in each of the three locations. The PEIR would assess the impacts of the different detention basin sites at a programmatic level (except Phoenix Lake). The local jurisdictions (if acting as the lead agency) could use the PEIR to prepare project level documents for the detention basin(s) in their jurisdictions.

6.2.2 Implementation Strategy

Alongside the PEIR Strategy, it is recommended that the District also adopt an implementation strategy to proceed with implementation (discussions with owners, planning level studies, cost estimates, conceptual designs, geotechnical studies, etc.) of the flow reducing elements included in the top scoring Program Alternative 3 which consists of Phoenix Lake, the former Nursery Site, Lefty Gomez Field, Deer Park, and Memorial Park. Adopting this implementation strategy will allow the District to concurrently make progress on the top scoring sites while the PEIR strategy preserves flexibility in the event any of those top scoring sites prove unimplementable. Between now and when the PEIR is ready to be released, if any of the sites are deemed to have a fatal flaw, they can be removed from consideration and replaced with the next site in the ranking for the sub-watershed as a priority site.

Alongside this approach, the District may wish to provide technical support to the Towns (if acting as the lead agency) to evaluate how various combinations of sites (if reduced detention facility sizes are

considered) would contribute to the overall flow reduction. The District and site owners will work together going forward to select the best sites to meet the targets. The 10-Year Work Plan will be updated periodically to include the current detention basin sites at any point in time.

Formal approval of each project is based on the ownership of the site as indicated in the table above. For example, approval is required from the Town of San Anselmo for Memorial Park; from Marin County Open Space District for the Loma Alta site; from Tamalpais Union High School District for Red Hill Park; from Marin Municipal Water District for Phoenix Lake; and from Ross Valley School District for Lefty Gomez Field and Deer Park. Sites with private ownership would need to be approved by the owner and also by the County, as all of the private sites under consideration are located within areas of unincorporated County.

Apart from the question of detention basins, there are several flood reducing elements that were evaluated to reduce localized flooding that the County may want to consider at a later date in lieu of the 180 proposed channel improvements identified in the CIP. For example, there may be opportunities to install bypass conduits that avoid modifying existing buildings next to the creek, or constructing flood walls along the creek, while still reducing the potential and frequency of flooding in downtown areas. Additionally, there are measures that the District should consider implementing as a part of a long term program such as having all new developments be compatible with best practices for Low Impact Development. The District may want to consider flood-proofing homes or purchasing some properties that are subject to repeated flooding as opportunities are presented.

6.3 Next Steps

On June 15, 2015 the Zone 9 Flood Advisory Board accepted the recommendations included in the Draft version of this report for both the PEIR Strategy and the Implementation Strategy, with the exception that the San Domenico School site has been eliminated from further consideration as a potential detention basin location at the request of the landowner. With the elimination of the San Domenico site, the Advisory Board opted to bring forward Brookside Elementary School and Hidden Valley Elementary School as back-up sites that could provide some flow reduction in the Sleepy Hollow watershed.

Therefore the PEIR for the Ross Valley Flood Protection and and Watershed Management Plan will evaluate five primary detention basins and five back-up detention basins as shown in Table 6-2. The five primary detention basin sites are shown in **bold text**, and the back-up basins are indicated with an asterisk.

Table 6-2. Detention Basin Sites Approved for Inclusion in the PEIR

Ross Valley Flood Protection and Watershed Program

Target Flow Locations	Ranking Within Sub-Watershed	Detention Basin Site	Ownership	Jurisdiction Location
Downstream End of Fairfax Town Hall	1	**Former Nursery Site**	Private	Unincorporated County of Marin
	2	**Lefty Gomez Field**	Ross Valley School District	Town of Fairfax
	3	Camp Bothin Youth Center*	Private	Unincorporated County of Marin
	4	Loma Alta Open Space*	Marin County Open Space District	Unincorporated County of Marin
San Anselmo Creek above Sycamore Bridge	1	**Memorial Park**	Town of San Anselmo	Town of San Anselmo
	2	**Deer Park**	Ross Valley School District	Town of Fairfax
	3	Red Hill Park*	Tamalpais Union High School District	Town of San Anselmo
Sleepy Hollow Creek above Sycamore Bridge	1	Hidden Valley Elementary School*	Ross Valley School District	Unincorporated County of Marin
	2	Brookside Elementary School*	Ross Valley School District	Town of San Anselmo
USGS Ross Gage	1	**Phoenix Lake**	Marin Municipal Water District	Unincorporated County of Marin

Notes:
The five primary detention basin sites to be evaluated in the Programmatic Environmental Impact Report (PEIR) are in **bold.**
*These sites will be included as "back-up" sites in the PEIR to provide environmental compliance in the event that one or more of the primary sites are determined to be infeasible.

Appendix A
Criteria Rating and Scoring Spreadsheets

Marin County Flood Reduction Evaluation

Flow Reduction Alternative Ranking Summary Evaluation Table

by CH2MHILL

6/12/2015

	Alternaitves			
	Alternative 1: Highest Ranked Elements	**Alternative 2: San Anselmo Option**	**Alternative 3: Most Environmentaly Friendly**	**Current CIP Project**
A1 Maximize Flow Reduction Benefit	123	119	150	103
A2 Maximize Community Benefit	120	120	120	120
A3 Avoid Flooding Downstream	150	150	150	150
B1 Minimize Environmental Impacts	79	77	82	82
B2 Maximize Environmental Enhancements	54	56	48	42
B3 Increase Ability to Obtain Permits	88	76	92	88
C1 Minimize Local Economic Impacts	49	49	50	47
C2 Minimize Operation and Maintenance Requirements	27	28	26	25
C3 Maximize Construction Feasibility	31	29	30	30
C4 Minimize Project Cost	48	46	47	49
C5 Maximize Funding Opportunities	43	40	43	45
D1 Maximize Public Benefit/Impact	42	40	43	41
D2 Minimize Inconvenience to Public - Permanent	42	44	41	38
D3 Minimize Inconvenience to Public - Temporary	28	30	27	27
E1 Minimize Coordination/ Schedule Requirements	16	15	16	17
Total Score	***941***	***919***	***966***	***904***
Ranking	***2***	***3***	***1***	***4***
Notes				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 1: Element Weighting Criteria for Element A: Creek Widening through San Anselmo

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.3	4		69
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										6.0	3		72
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	6.0				
B3 Increase Ability to Obtain Permits										2.0	5		40
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	2.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Table 1: Element Weighting Criteria for Element A: Creek Widening through San Anselmo

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.0	3		36
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	2.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										5.8	2		35
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	5.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										4.0	2		24
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	2.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					5.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	5.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
	4
Consider	3
Important to Consider	2
to Consider	1

Table 1: Element Weighting Criteria for Element A: Creek Widening through San Anselmo

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										5.6	3		50
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	2.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.4	2		26
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.6				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.0	2		16
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

Marin County Flood
Flow Reduction Element Selection Criteria Rating & Weighting Process
by CH2MHILL
3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 2: Element Weighting Criteria for Element A: Bypass Conduit through San Anselmo Along Cedar Street

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 2: Element Weighting Criteria for Element A: Bypass Conduit through San Anselmo Along Cedar Street

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										6.0	2		36
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	6.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.2	3		38
	Construction Cost	*planning level estimate*		Most Expensive					4.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

Marin County Flood
Flow Reduction Element Selection Criteria Rating & Weighting Process
by CH2MHILL
3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 2: Element Weighting Criteria for Element A: Bypass Conduit through San Anselmo Along Cedar Street

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.5	2		21
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.8				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										5.2	2		21
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 3: Element Weighting Criteria for Element B2: Bypass Conduit Along San Anselmo Avenue

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Table 3: Element Weighting Criteria for Element B2: Bypass Conduit Along San Anselmo Avenue

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										6.0	2		36
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	6.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.3	3		39
	Construction Cost	*planning level estimate*		Most Expensive					4.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Table 3: Element Weighting Criteria for Element B2: Bypass Conduit Along San Anselmo Avenue

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.5	2		21
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.9				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										5.2	2		21
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 4: Element Weighting Criteria for Element C: Creek Widening through San Anselmo

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 4: Element Weighting Criteria for Element C: Creek Widening through San Anselmo

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										6.0	2		36
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	6.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.2	3		38
	Construction Cost	*planning level estimate*		Most Expensive					4.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 4: Element Weighting Criteria for Element C: Creek Widening through San Anselmo

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.5	2		21
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.8				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										5.2	2		21
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 5: Element Weighting Criteria for Element D: Bypass Conduit through Fairfax

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Table 5: Element Weighting Criteria for Element D: Bypass Conduit through Fairfax

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										6.0	2		36
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	6.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.4	3		39
	Construction Cost	*planning level estimate*		Most Expensive					4.8				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 5: Element Weighting Criteria for Element D: Bypass Conduit through Fairfax

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.5	2		21
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.9				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										5.2	2		21
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 6: Element Weighting Criteria for Element E: Setback Levees at A.E. Kent Middle School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.0	4		64
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	4.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										3.0	5		60
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	3.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 6: Element Weighting Criteria for Element E: Setback Levees at A.E. Kent Middle School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										3.3	3		30
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	2.0				
C2 Minimize Operation and Maintenance Requirements										4.3	2		26
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										2.7	3		24
	Construction Cost	*planning level estimate*		Most Expensive					3.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	2.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 6: Element Weighting Criteria for Element E: Setback Levees at A.E. Kent Middle School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	4.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										3.3	3		30
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.5	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.8				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										2.8	2		11
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 7: Element Weighting Criteria for Element F: Setback Levees at Hal Brown Park at Creekside

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.0	4		64
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	4.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	4.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										3.0	5		60
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	3.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 7: Element Weighting Criteria for Element F: Setback Levees at Hal Brown Park at Creekside

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.3	2		26
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										3.2	3		29
	Construction Cost	*planning level estimate*		Most Expensive					4.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	2.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 7: Element Weighting Criteria for Element F: Setback Levees at Hal Brown Park at Creekside

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	4.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										3.3	3		30
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										5.0	2		30
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.9				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 8: Element Weighting Criteria for Element G: Utilize Surface Streets for Conveyance (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.3	4		69
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	2.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	2.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

3/18/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 8: Element Weighting Criteria for Element G: Utilize Surface Streets for Conveyance (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										5.5	2		33
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	5.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	5.0				
C3 Maximize Construction Feasibility										5.3	2		32
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.3	3		48
	Construction Cost	*planning level estimate*		Most Expensive					4.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	2.0				

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Table 8: Element Weighting Criteria for Element G: Utilize Surface Streets for Conveyance (not shown on map)

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.6	3		32
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	4.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										3.3	3		30
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	2.0				
D3 Minimize Inconvenience to Public - Temporary										3.4	2		20
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.6				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										6.0	2		24
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	6.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 9: Element Weighting Criteria for Element H: Purchase flood prone properties (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										6.0	5		120
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	6.0				

Marin County Flood

Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 9: Element Weighting Criteria for Element H: Purchase flood prone properties (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										3.3	3		30
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	2.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	2.0				
C2 Minimize Operation and Maintenance Requirements										3.5	2		21
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	2.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										6.0	2		36
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										3.4	3		30
	Construction Cost	*planning level estimate*		Most Expensive					4.7				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	2.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 9: Element Weighting Criteria for Element H: Purchase flood prone properties (not shown on map)

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										2.7	3		24
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	2.0				
D3 Minimize Inconvenience to Public - Temporary										4.0	2		24
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	6.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	6.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	2.0				

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by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 10: Element Weighting Criteria for Element I: Flood proofing (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										6.0	5		120
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	6.0				

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by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 10: Element Weighting Criteria for Element I: Flood proofing (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										3.3	3		30
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	2.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	2.0				
C2 Minimize Operation and Maintenance Requirements										3.0	2		18
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	2.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										6.0	2		36
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										5.9	3		53
	Construction Cost	*planning level estimate*		Most Expensive					5.7				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Table 10: Element Weighting Criteria for Element I: Flood proofing (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.0	2		24
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	6.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										5.2	2		21
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	6.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	6.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	2.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 11: Element Weighting Criteria for Element J: Implement LID Provisions (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										0.0	5		0
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	0.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.4	4		87
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										6.0	5		120
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	6.0				

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by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 11: Element Weighting Criteria for Element J: Implement LID Provisions (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	4.0				
C2 Minimize Operation and Maintenance Requirements										3.0	2		18
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	2.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	2.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.7	3		51
	Construction Cost	*planning level estimate*		Most Expensive					5.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 11: Element Weighting Criteria for Element J: Implement LID Provisions (not shown on map)

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.3	3		39
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	3.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.5	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	2.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	6.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.0	2		16
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	4.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 12: Element Weighting Criteria for Element K: Underground Parking Detention (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.1	5		53
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.1				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 12: Element Weighting Criteria for Element K: Underground Parking Detention (not shown on map)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										2.5	2		15
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	2.0				
	Long Term O&M	*level of effort*		most effort				least effort	2.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	2.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	5.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.6	3		42
	Construction Cost	*planning level estimate*		Most Expensive					5.3				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 12: Element Weighting Criteria for Element K: Underground Parking Detention (not shown on map)

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										2.4	3		22
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	4.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			0.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	4.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	6.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.4	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.7				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.0	2		16
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 13: Element Weighting Criteria for Element L: Bothin Park Detention Facility

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.7	5		67
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.7				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.3	4		69
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	2.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										5.5	3		66
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	5.0				
B3 Increase Ability to Obtain Permits										3.0	5		60
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	3.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 13: Element Weighting Criteria for Element L: Bothin Park Detention Facility

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.8	2		29
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	5.0				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	3.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										5.4	3		48
	Construction Cost	*planning level estimate*		Most Expensive					5.7				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	5.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 13: Element Weighting Criteria for Element L: Bothin Park Detention Facility

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.4	3		40
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.7	3		42
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.8	2		29
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 14: Element Weighting Criteria for Element M: Nursery near Baywood Canyon Drive and SFD

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.1	5		77
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.1				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										5.0	3		60
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	4.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 14: Element Weighting Criteria for Element M: Nursery near Baywood Canyon Drive and SFD

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
											Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										6.0	3		54
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.8	2		29
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	5.0				
C3 Maximize Construction Feasibility										5.3	2		32
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	5.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										4.8	3		43
	Construction Cost	*planning level estimate*		Most Expensive					5.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

Marin County Flood
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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 14: Element Weighting Criteria for Element M: Nursery near Baywood Canyon Drive and SFD

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	4.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.6	2		28
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.5				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	2.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 15: Element Weighting Criteria for Element N: Manor Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.2	5		56
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.4	4		87
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
	2
Important to Consider	
Somewhat Important to Consider	1

Table 15: Element Weighting Criteria for Element N: Manor Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 15: Element Weighting Criteria for Element N: Manor Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										6.0	3		54
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 15: Element Weighting Criteria for Element N: Manor Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.7	3		42
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										4.4	2		26
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.6				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.8	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	5.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 16: Element Weighting Criteria for Element O: Hidden Valley Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.3	5		58
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.3				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										6.0	4		96
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 16: Element Weighting Criteria for Element O: Hidden Valley Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										3.7	2		22
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	4.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	3.0				
C4 Minimize Project Cost										6.0	3		54
	Construction Cost	*planning level estimate*		Most Expensive					5.9				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 16: Element Weighting Criteria for Element O: Hidden Valley Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.7	3		42
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										3.9	2		23
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.5				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.8	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	5.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 17: Element Weighting Criteria for Element P: Brookside Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.1	5		53
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.1				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										6.0	4		96
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

Marin County Flood
Reduction Evaluation
Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 17: Element Weighting Criteria for Element P: Brookside Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										3.7	2		22
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	4.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	3.0				
C4 Minimize Project Cost										6.0	3		54
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

Marin County Flood
Reduction Evaluation
Flow Reduction Element Selection Criteria Rating & Weighting Process

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 17: Element Weighting Criteria for Element P: Brookside Elementary School

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.7	3		42
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										3.9	2		24
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.7				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.8	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	5.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 18: Element Weighting Criteria for Element Q1: San Domenico School Upstream

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.3	5		82
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.3				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.6	4		73
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										5.0	3		60
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	4.0				
B3 Increase Ability to Obtain Permits										3.0	5		60

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by CH2MHILL

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 18: Element Weighting Criteria for Element Q1: San Domenico School Upstream

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	3.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 18: Element Weighting Criteria for Element Q1: San Domenico School Upstream

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.3	2		26
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										3.7	2		22
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	4.0				
	Restricted Working Windows	*Will project have restricted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	3.0				
C4 Minimize Project Cost										4.7	3		43
	Construction Cost	*planning level estimate*		Most Expensive					5.5				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 18: Element Weighting Criteria for Element Q1: San Domenico School Upstream

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										5.3	3		48
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										5.6	2		33
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.3				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.0	2		12
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes		nearby		No	4.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	3.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 19: Element Weighting Criteria for Element Q2: San Domenico Ball Field Pond

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.1	5		53
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.1				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives										
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.4	4		87
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										3.0	3		36
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	4.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 19: Element Weighting Criteria for Element Q2: San Domenico Ball Field Pond

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										4.3	2		26
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	5.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Table 19: Element Weighting Criteria for Element Q2: San Domenico Ball Field Pond

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.9	2		24
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.7				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

Marin County Flood
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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 20: Element Weighting Criteria for Element R: Deer Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.1	5		77
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.1				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.7	4		75
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										6.0	3		72
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	6.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Flow Reduction Element Selection Criteria Rating & Weighting Process

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 20: Element Weighting Criteria for Element R: Deer Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.5	2		27
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.0	2		24
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	3.0				
	Restricted Working Windows	*Will project have restricted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	3.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										4.8	3		43
	Construction Cost	*planning level estimate*		Most Expensive					5.5				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 20: Element Weighting Criteria for Element R: Deer Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										5.3	3		48
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										4.6	2		28
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.5				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes		nearby		No	4.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

Marin County Flood

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 21: Element Weighting Criteria for Element S: Marin Stables (Woodland Horse Stables)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.2	5		54
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										5.0	3		60
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				

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by CH2MHILL

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 21: Element Weighting Criteria for Element S: Marin Stables (Woodland Horse Stables)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	4.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 21: Element Weighting Criteria for Element S: Marin Stables (Woodland Horse Stables)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										3.7	3		33
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	3.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	4.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.0	2		24
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	4.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 21: Element Weighting Criteria for Element S: Marin Stables (Woodland Horse Stables)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	4.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.4	2		26
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.7				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.4	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	3.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 22: Element Weighting Criteria for Element T: Pine Mountain Tunnel

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.0	5		50
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.3	4		69
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Table 22: Element Weighting Criteria for Element T: Pine Mountain Tunnel

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										6.0	3		54
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										3.5	2		21
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	2.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	2.0				
C3 Maximize Construction Feasibility										3.3	2		20
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	2.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	2.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										3.0	3		27
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	4.0				

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Table 22: Element Weighting Criteria for Element T: Pine Mountain Tunnel

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										5.3	3		48
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										6.0	2		36
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.8				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										2.8	2		11
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	2.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 23: Element Weighting Criteria for Element U: Detention Facilities along Cascade Creek

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.5	5		88
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.5				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.0	4		64
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	2.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	2.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	2.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										0.0	5		0
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	0.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 23: Element Weighting Criteria for Element U: Detention Facilities along Cascade Creek

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										6.0	3		54
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										5.0	2		30
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	6.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.0	2		24
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	2.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.7	3		51
	Construction Cost	*planning level estimate*		Most Expensive					5.3				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										2.0	3		18
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	2.0				

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Table 23: Element Weighting Criteria for Element U: Detention Facilities along Cascade Creek

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										3.3	3		30
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.5	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 24: Element Weighting Criteria for Element V: Camp Tamerancha Lake

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.3	5		57
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.3				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Table 24: Element Weighting Criteria for Element V: Camp Tamerancha Lake

Weighting Description	Weighting
Project Success of Project	5
	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.7	3		42
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	4.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.5	2		27
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.0	2		24
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	4.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Table 24: Element Weighting Criteria for Element V: Camp Tamerancha Lake

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.4	3		40
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.9	2		29
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.5				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										2.8	2		11
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 25: Element Weighting Criteria for Element W1: Marin Town Country Club Detention Pond

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										5.3	5		133
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	5.3				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		78
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 25: Element Weighting Criteria for Element W1: Marin Town Country Club Detention Pond

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.0	3		36
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	2.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	5.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	5.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										3.2	3		29
	Construction Cost	*planning level estimate*		Most Expensive					4.4				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	2.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 25: Element Weighting Criteria for Element W1: Marin Town Country Club Detention Pond

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	4.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	2.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										3.3	3		30
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	2.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.0	2		18
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	2.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										2.8	2		11
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	2.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 26: Element Weighting Criteria for Element W2: Marin Town Country Club Underground Cistern

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.2	5		81
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.4	4		87
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel		Medium Removal (Dam Across		Small Removal (Connection to	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	2.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream	2.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in		Some Impacts to Channel		Potential For Stream	4.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 26: Element Weighting Criteria for Element W2: Marin Town Country Club Underground Cistern

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										6.0	3		54
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										2.5	2		15
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	2.0				
	Long Term O&M	*level of effort*		most effort				least effort	2.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	2.0				
C3 Maximize Construction Feasibility										5.3	2		32
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										3.8	3		34
	Construction Cost	*planning level estimate*		Most Expensive					3.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 26: Element Weighting Criteria for Element W2: Marin Town Country Club Underground Cistern

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										3.2	3		29
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			0.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	2.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	2.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										3.6	2		22
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	2.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.3				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.8	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	2.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	3.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 27: Element Weighting Criteria for Element 1: Lefty Gomez

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.2	5		80
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	6.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										3.0	3		36
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	4.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 27: Element Weighting Criteria for Element 1: Lefty Gomez

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.0	2		24
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have restricted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										4.8	3		43
	Construction Cost	*planning level estimate*		Most Expensive					5.5				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 27: Element Weighting Criteria for Element 1: Lefty Gomez

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.1	2		25
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.4				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.8	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	2.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	5.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
	2
Important to Consider	
Somewhat Important to Consider	1

Table 28: Element Weighting Criteria for Element 2: Loma Alta

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.2	5		56
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.6	4		73
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	4.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	4.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										5.5	3		66
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	6.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	5.0				
B3 Increase Ability to Obtain Permits										3.0	5		60
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	3.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 28: Element Weighting Criteria for Element 2: Loma Alta

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.5	2		27
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.0				
C3 Maximize Construction Feasibility										4.3	2		26
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	5.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.0	3		45
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.0				
C5 Maximize Funding Opportunities										4.0	3		36
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 28: Element Weighting Criteria for Element 2: Loma Alta

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.2	3		38
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	5.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.4	2		26
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.6				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.6	2		14
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes		neabry		No	4.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	2.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 29: Element Weighting Criteria for Element 3: Memorial Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										3.0	5		76
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	3.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.3	4		85
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	5.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	5.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	5.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	5.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										4.0	3		48
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	6.0				
B3 Increase Ability to Obtain Permits										6.0	5		120
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 29: Element Weighting Criteria for Element 3: Memorial Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
											Recommended Weighting Factors		
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.3	3		48
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										3.5	2		21
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										5.3	2		32
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have resticted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										5.7	3		52
	Construction Cost	*planning level estimate*		Most Expensive					5.5				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										6.0	3		54
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	6.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 29: Element Weighting Criteria for Element 3: Memorial Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.4	3		40
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	4.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	6.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.2	2		25
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	2.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.6				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.8	2		19
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 30: Element Weighting Criteria for Element 4: Red Hill Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										2.3	5		57
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.3				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.3	4		85
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	5.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	5.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	5.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	5.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	6.0				
B2 Maximize Environmental Enhancements										3.0	3		36
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	4.0				
B3 Increase Ability to Obtain Permits										4.0	5		80
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	4.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 30: Element Weighting Criteria for Element 4: Red Hill Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										4.0	3		36
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	4.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	2.0				
C2 Minimize Operation and Maintenance Requirements										3.5	2		21
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	4.0				
	Long Term O&M	*level of effort*		most effort				least effort	3.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.0				
C3 Maximize Construction Feasibility										4.7	2		28
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have restricted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	4.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.0				
C4 Minimize Project Cost										6.0	3		54
	Construction Cost	*planning level estimate*		Most Expensive					6.0				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										5.0	3		45
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 30: Element Weighting Criteria for Element 4: Red Hill Park

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.0	3		36
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	4.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.0	3		36
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	4.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	4.0				
D3 Minimize Inconvenience to Public - Temporary										4.9	2		29
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	5.5				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.8	2		19
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	4.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	4.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 31: Element Weighting Criteria for Element 5: Phoenix Lake

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6	Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										5.2	5		131
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	5.2				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*	To be evaluated once elements are combined into alternatives									Channe	
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross		To be evaluated once elements are combined into alternatives										
	Frequency of Flooding Reduced?		To be evaluated once elements are combined into alternatives										
A2 Maximize Community Benefits											4		
	Homes Removed from Floodplain		To be evaluated once elements are combined into alternatives										
	Improve Emergency Access Routes?		To be evaluated once elements are combined into alternatives										
	Minimize Inland Flooding on Surface Streets		To be evaluated once elements are combined into alternatives										
A3 Avoid Flooding Downstream											5		
	Project Increase Flooding Downstream of Ross?	*Yes or No*	To be evaluated once elements are combined into alternatives										
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.3	4		85
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	3.0				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	6.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	6.0				
	Vegetation Removal	*area of native vegetation removal along a channel*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		High Removal (Channel Excavation)		Medium Removal (Dam Across Channel)		Small Removal (Connection to Channel)	6.0				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	4.0				
B2 Maximize Environmental Enhancements										2.0	3		24
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.0				
	Stream Restoration Potential	*Are there opportunities to enhance the channel not just restore it.*		No Opportunity for Improvments		Same Condition as today		Improved Natural Stream Conveyance	2.0				
B3 Increase Ability to Obtain Permits										5.0	5		100
	Ability to Gain Environmental Permit Approvals	*level of effort*	No	Dam Across A channel in Environmentally Sensative Areas		Some Impacts to Channel		Potential For Stream Enhancements (Parks and Schools)	5.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 31: Element Weighting Criteria for Element 5: Phoenix Lake

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										6.0	3		54
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of use of Land/Sports Facilities	*Will project require closure of public parks or portions of property.*		Yes, permanently		Yes, temporarily		No	6.0				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										5.3	2		32
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*Will the Facility require pumps to drain water*		Requires Pumping		Groundwater Management		No pumping required	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	5.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	6.0				
C3 Maximize Construction Feasibility										6.0	2		36
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads		Narrow Residential Streets		Access road immediately adjacent to site	6.0				
	Restricted Working Windows	*Will project have restricted environmental/school working windows*		Active Channel	Dam Across Protected Sites	Schools		No Limitations	6.0				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	6.0				
C4 Minimize Project Cost										5.9	3		53
	Construction Cost	*planning level estimate*		Most Expensive					5.8				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	6.0				
C5 Maximize Funding Opportunities										6.0	3		54
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	6.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Critical to Success of Project	5
Very Important to Success of Project	4
Very Important to Consider	3
Important to Consider	2
Somewhat Important to Consider	1

Table 31: Element Weighting Criteria for Element 5: Phoenix Lake

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										5.2	3		47
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	6.0				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek - maintain creek living			No				Yes	6.0				
	repair and improve condition of parks	*potential to replace and repair park amenities?*		No improvments possible		Maintain exisitng site conditions		Replace and Repair	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										5.3	3		48
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to facility			Yes permanently		temporary impacts		No	6.0				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes permanently		temporary impacts		No	6.0				
D3 Minimize Inconvenience to Public - Temporary										5.0	2		30
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	6.0				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	6.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	2.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.6	2		18
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	6.0				
	School District Coordination Required	*Yes or No*		Yes				No	6.0				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.0				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	3.0				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	6.0				

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Table 32: Alternative Weighting Criteria for Alternative 1: Highest Ranked Elements

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										4.9	5		123
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	4.8				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*		smallest decrease				largest decrease	2.8				
		At Fairfax		smallest decrease				largest decrease	2.0				
		At San Anselmo		smallest decrease				largest decrease	3.2				
		At Ross		smallest decrease				largest decrease	3.3				
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross			No				Yes	6.0				
	Frequency of Flooding Reduced?			smallest number				largest number	6.0				
A2 Maximize Community Benefits										6.0	4		120
	Homes Removed from Floodplain			smallest number				largest number	6.0				
	Improve Emergency Access Routes?			No				Yes	6.0				
	Minimize Inland Flooding on Surface Streets			smallest area of reduction				Largest Area of Reduction	6.0				
A3 Avoid Flooding Downstream										6.0	5		150
	Project Increase Flooding Downstream of Ross?	*Yes or No*	Yes					No	6.0				
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.9	4		79
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.4				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.2				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream) (Named Creeks)		Yes temporarily (On Stream, Un-named Creeks)		No (Off Creek)	4.6				
	Vegetation Removal	*area of native vegetation removal*		largest number				smallest number	4.2				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		Yes		NA		No	4.6				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	5.6				
B2 Maximize Environmental Enhancements										4.5	3		54
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	4.4				
	Stream Restoration Potential			No				Yes	4.6				
B3 Increase Ability to Obtain Permits										4.4	5		88
	Ability to Gain Permit Approvals	*level of effort (Yes/No)*	No	most difficult				least difficult	4.4				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 32: Alternative Weighting Criteria for Alternative 1: Highest Ranked Elements

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.5	3		49
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	5.6				
	Temporary Loss of Revenue for Ball field Leases	*Will project require closure of public parks*		Yes, permanently		Yes, temporarily		No	4.8				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.6	2		27
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*total vertical head of pumping*		most effort		only to drain		no pumping	5.6				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.6				
C3 Maximize Construction Feasibility										5.1	2		31
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads				access road immediately	5.2				
	Restricted Working Windows	*Will project have restricted working windows*		Yes				No	4.6				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	5.6				
C4 Minimize Project Cost										5.3	3		48
	Construction Cost	*planning level estimate*							5.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	5.0				
C5 Maximize Funding Opportunities										4.8	3		43
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	3.6				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Table 32: Alternative Weighting Criteria for Alternative 1: Highest Ranked Elements

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw	Low	Med-Low	Med	Med-Hi	High	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting	Category Weighting	Criteria Score
			0	2	3	4	5	6			(1-5)	(1-5)	(columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.7	3		42
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	3.2				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek (private residential properties)-maintain creek living			No				Yes	5.6				
	Improve condition of parks	*potential to improve park amenities?*		No		replace in kind		Yes	4.8				
D2 Minimize Inconvenience to Public - Permanent Project										4.7	3		42
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to creek (river life)	*change character of creek living?*		Yes permanently		temporary impacts		No	5.2				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes		same		improve	4.8				
D3 Minimize Inconvenience to Public - Temporary										4.6	2		28
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.4				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.0				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.1				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.0	2		16
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes		willing to consider		No	5.6				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.8				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	3.4				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.4				

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Table 33: Alternative Weighting Criteria for Alternative 2: San Anselmo Option (Detention on Sleepy Hollow Creek)

Weighting Description	Weighting
Project	5
Success of Project	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										4.8	5		119
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	5.4				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*		smallest decrease				largest decrease	2.9				
		At Fairfax		smallest decrease				largest decrease	2.0				
		At San Anselmo		smallest decrease				largest decrease	3.2				
		At Ross		smallest decrease				largest decrease	3.5				
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross			No				Yes					
	Frequency of Flooding Reduced?			smallest number				largest number	6.0				
A2 Maximize Community Benefits										6.0	4		120
	Homes Removed from Floodplain			smallest number				largest number	6.0				
	Improve Emergency Access Routes?			No				Yes	6.0				
	Minimize Inland Flooding on Surface Streets			smallest area of reduction				Largest Area of Reduction	6.0				
A3 Avoid Flooding Downstream										6.0	5		150
	Project Increase Flooding Downstream of Ross?	*Yes or No*	Yes					No	6.0				
B. Protect Environment												4	
B1 Minimize Environmental Impacts										4.8	4		77
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.2				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.0				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.4				
	Vegetation Removal	*area of native vegetation removal*		largest number				smallest number	4.0				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		Yes		NA		No	4.4				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	5.6				
B2 Maximize Environmental Enhancements										4.7	3		56
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	5.2				
	Stream Restoration Potential			No				Yes	4.2				
B3 Increase Ability to Obtain Permits										3.8	5		76
	Ability to Gain Permit Approvals	*level of effort (Yes/No)*	No	most difficult				least difficult	3.8				

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Table 33: Alternative Weighting Criteria for Alternative 2: San Anselmo Option (Detention on Sleepy Hollow Creek)

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.5	3		49
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	5.2				
	Temporary Loss of Revenue for Ball field Leases	*Will project require closure of public parks*		Yes, permanently		Yes, temporarily		No	5.2				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.7	2		28
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*total vertical head of pumping*		most effort		only to drain		no pumping	6.0				
	Long Term O&M	*level of effort*		most effort				least effort	4.0				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.8				
C3 Maximize Construction Feasibility										4.8	2		29
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads				access road immediately	4.8				
	Restricted Working Windows	*Will project have resticted working windows*		Yes				No	4.2				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	5.4				
C4 Minimize Project Cost										5.1	3		46
	Construction Cost	*planning level estimate*							5.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.6				
C5 Maximize Funding Opportunities										4.4	3		40
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	2.8				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

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Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 33: Alternative Weighting Criteria for Alternative 2: San Anselmo Option (Detention on Sleepy Hollow Creek)

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw	Low	Med-Low	Med	Med-Hi	High	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting	Category Weighting	Criteria Score
			0	2	3	4	5	6			(1-5)	(1-5)	(columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.5	3		40
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	3.2				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	5.2				
	Visibility and Aesthetics along Creek (private residential properties)-maintain creek living			No				Yes	6.0				
	Improve condition of parks	*potential to improve park amenities?*		No		replace in kind		Yes	4.0				
D2 Minimize Inconvenience to Public - Permanent Project										4.9	3		44
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to creek (river life)	*change character of creek living?*		Yes permanently		temporary impacts		No	5.6				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes		same		improve	5.2				
D3 Minimize Inconvenience to Public - Temporary										4.9	2		30
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.8				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	4.8				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.1				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										3.7	2		15
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	3.6				
	School District Coordination Required	*Yes or No*		Yes		willing to consider		No	5.2				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	2.4				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	3.4				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	3.8				

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Table 34: Alternative Weighting Criteria for Alternative 3: Most Environmentally Friendly Elements

Weighting Description	Weighting
Project Success of Project Consider Important to Consider to Consider	5 4 3 2 1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										6.0	5		150
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	6.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*		smallest decrease				largest decrease	6.0				
		At Fairfax		smallest decrease				largest decrease	6.0				
		At San Anselmo		smallest decrease				largest decrease	6.0				
		At Ross		smallest decrease				largest decrease	6.0				
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross			No				Yes					
	Frequency of Flooding Reduced?			smallest number				largest number	6.0				
A2 Maximize Community Benefits										6.0	4		120
	Homes Removed from Floodplain			smallest number				largest number	6.0				
	Improve Emergency Access Routes?			No				Yes	6.0				
	Minimize Inland Flooding on Surface Streets			smallest area of reduction				Largest Area of Reduction	6.0				
A3 Avoid Flooding Downstream										6.0	5		150
	Project Increase Flooding Downstream of Ross?	*Yes or No*	Yes					No	6.0				
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.8				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.6				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.6				
	Vegetation Removal	*area of native vegetation removal*		largest number				smallest number	4.6				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		Yes		NA		No	4.6				
	Potential for recharging ground water	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	5.6				
B2 Maximize Environmental Enhancements										4.0	3		48
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	3.6				
	Stream Restoration Potential			No				Yes	4.4				
B3 Increase Ability to Obtain Permits										4.6	5		92
	Ability to Gain Permit Approvals	*level of effort (Yes/No)*	No	most difficult				least difficult	4.6				

Marin County Flood

Flow Reduction Alternative Selection Criteria Rating & Weighting Process

by CH2MHILL

6/12/2015

Table 34: Alternative Weighting Criteria for Alternative 3: Most Environmentally Friendly Elements

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.6	3		50
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of Revenue for Ball field Leases	*Will project require closure of public parks*		Yes, permanently		Yes, temporarily		No	4.8				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	6.0				
C2 Minimize Operation and Maintenance Requirements										4.4	2		26
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*total vertical head of pumping*		most effort		only to drain		no pumping	5.6				
	Long Term O&M	*level of effort*		most effort				least effort	3.8				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	4.2				
C3 Maximize Construction Feasibility										5.1	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads				access road immediately	5.2				
	Restricted Working Windows	*Will project have resticted working windows*		Yes				No	4.8				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	5.2				
C4 Minimize Project Cost										5.2	3		47
	Construction Cost	*planning level estimate*							5.6				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	4.8				
C5 Maximize Funding Opportunities										4.8	3		43
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	3.6				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

Marin County Flood

Flow Reduction Alternative Selection Criteria Rating & Weighting Process

by CH2MHILL

6/12/2015

Table 34: Alternative Weighting Criteria for Alternative 3: Most Environmentally Friendly Elements

Weighting Description	Weighting
Project Success of Project	5
	4
Consider	3
Important to Consider	2
to Consider	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw	Low	Med-Low	Med	Med-Hi	High	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting	Category Weighting	Criteria Score
			0	2	3	4	5	6			(1-5)	(1-5)	(columns KxLxM)
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.8	3		43
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	3.2				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	6.0				
	Visibility and Aesthetics along Creek (private residential properties)-maintain creek living			No				Yes	5.6				
	Improve condition of parks	*potential to improve park amenities?*		No		replace in kind		Yes	5.2				
D2 Minimize Inconvenience to Public - Permanent Project										4.5	3		41
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to creek (river life)	*change character of creek living?*		Yes permanently		temporary impacts		No	4.8				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes		same		improve	4.8				
D3 Minimize Inconvenience to Public - Temporary										4.5	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.4				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	3.6				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.0				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.1	2		16
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.0				
	School District Coordination Required	*Yes or No*		Yes		willing to consider		No	4.8				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	3.2				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	3.8				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	4.6				

Marin County Flood

Flow Reduction Alternative Selection Criteria Rating & Weighting Process

by CH2MHILL

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Table 35: Alternative Weighting Criteria for The Existing CIP Project

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
A. Reduce Flooding Potential												5	
A1 Maximize Flood Reduction Benefit										4.1	5		103
	Acre -feet of Flow Reduction Potential	*potential flow reduction volume in system*		smallest number				largest number	2.0				
	Impact to Water Surface Elevation (conveyance)	*detention basin /storage system location impact on water surface d/s*		smallest decrease				largest decrease	2.5				
		At Fairfax		smallest decrease				largest decrease	3.5				
		At San Anselmo		smallest decrease				largest decrease	2.0				
		At Ross		smallest decrease				largest decrease	2.0				
	Reduce Flooding Potential in Corta Madera Creek d/s of Ross			No				Yes	6.0				
	Frequency of Flooding Reduced?			Lowest Return Interval				Highest Return Interval	6.0				
A2 Maximize Community Benefits										6.0	4		120
	Homes Removed from Floodplain			smallest number				largest number	6.0				
	Improve Emergency Access Routes?			No				Yes	6.0				
	Minimize Inland Flooding on Surface Streets			smallest area of reduction				Largest Area of Reduction	6.0				
A3 Avoid Flooding Downstream										6.0	5		150
	Project Increase Flooding Downstream of Ross?	*Yes or No*	Yes					No	6.0				
B. Protect Environment												4	
B1 Minimize Environmental Impacts										5.1	4		82
	Sediment Load d/s of Ross	*Potential to increase sediment deposits in Corte Madera Creek near Larkspur?*	Yes			NA		No	6.0				
	Inundation of Sensitive Habitat	*Will project inundate sensitive or native habitat?*		Yes, permanently (On stream)		Yes, temporarily (Off Stream)		No (Schools)	4.6				
	Impacts to Endangered Species			Yes, permanently (On Stream)		Yes temporarily (Off Stream)		No (Schools)	5.2				
	Impacts Fish Migration/Spawning Habitat	*Does project require placing dams or fish barriers inside active stream channels?*		Yes, permanently (On Stream)		Yes temporarily (On Stream, Un-		No (Off Creek)	4.8				
	Vegetation Removal	*area of native vegetation removal*		largest number				smallest number	4.8				
	Water Quality Impacts (temperature)	*Does project require removal of trees within active channels?*		Yes		NA		No	4.8				
	Alterntive 4	*concrete lining on bottom of channel/detention basin*		Yes		NA		No	5.6				
B2 Maximize Environmental Enhancements										3.5	3		42
	Wetland Creation/Protection	*Is there a potential to expand wetland or native planting areas?*		No				Yes	2.8				
	Stream Restoration Potential			No				Yes	4.2				
B3 Increase Ability to Obtain Permits										4.4	5		88
	Ability to Gain Permit Approvals	*level of effort (Yes/No)*	No	most difficult				least difficult	4.4				

Marin County Flood

Flow Reduction Alternative Selection Criteria Rating & Weighting Process

by CH2MHILL

6/12/2015

Table 35: Alternative Weighting Criteria for The Existing CIP Project

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating	Criteria Rating	Recommended Weighting Factors		
			Fatal Flaw	Low	Med-Low	Med	Med-Hi	High	(per rating sheet) (0-6)	Average (Ave Factor Rating)	Criteria Weighting	Category Weighting	Criteria Score
			0	2	3	4	5	6			(1-5)	(1-5)	(columns KxLxM)
C. Optimize Costs & Benefits												3	
C1 Minimize Local Economic Impacts										5.2	3		47
	Impacts to Businesses	*Will project impact businesses?*		Yes, permanently		Yes, temporarily		No	6.0				
	Temporary Loss of Revenue for Ball field Leases	*Will project require closure of public parks*		Yes, permanently		Yes, temporarily		No	4.4				
	Impacts to Ex. Improvement/ (artificial turf fields)	*Has site been recently Improved (Yes/No)*		Yes		NA		No	5.2				
C2 Minimize Operation and Maintenance Requirements										4.2	2		25
	Passive vs. Active Operation	*level of effort*		manual		automated		passive system	4.0				
	Require Pumping Operations	*total vertical head of pumping*		most effort		only to drain		no pumping	5.2				
	Long Term O&M	*level of effort*		most effort				least effort	3.6				
	Time to Restore Facility to Working Order	*level of effort*		most effort				least effort	3.8				
C3 Maximize Construction Feasibility										5.0	2		30
	Construction Accessibility	*level of difficulty to access site during construction*		need to build access roads				access road immediately	5.8				
	Restricted Working Windows	*Will project have resticted working windows*		Yes				No	4.8				
	Temporary Staging Areas	*available area for staging operations?*		none on site		near site		on site	4.4				
C4 Minimize Project Cost										5.5	3		49
	Construction Cost	*planning level estimate*							5.8				
	Right-of-way	*private parcels need to be purchased*	Condemnation required	More than 1 property/home		1 property		no properties	5.2				
C5 Maximize Funding Opportunities										5.0	3		45
	Conforms to current/near-term grant opportunities	*Yes or No*		No		maybe transferred		Yes	4.0				
	Flood Zone 9 Fee Eligibility	*Yes or No*		No		meet some criteria		Yes	6.0				

Marin County Flood
Flow Reduction Alternative Selection Criteria Rating & Weighting Process
by CH2MHILL
6/12/2015

Weighting Description	Weighting
Project Success of Project	5
Consider	4
Important to Consider	3
to Consider	2
	1

Table 35: Alternative Weighting Criteria for The Existing CIP Project

Category/Criteria	Factors Contributing to Criteria Rating	Factor Measurement	Scoring System to Develop Factor Rating						J	K	L	M	N
									Factor Rating (per rating sheet) (0-6)	Criteria Rating Average (Ave Factor Rating)	Recommended Weighting Factors Criteria Weighting (1-5)	Category Weighting (1-5)	Criteria Score (columns KxLxM)
			Fatal Flaw 0	Low 2	Med-Low 3	Med 4	Med-Hi 5	High 6					
D. Gain Public Acceptance												3	
D1 Maximize Public Acceptance										4.5	3		41
	Public Safety - operation near schools/parks	*proximity to schools and public parks*		on site		near		furthest away	2.8				
	Public Safety - potential to trap people?	*Yes or No*	Yes			No			4.0				
	Maximize opportunities for recreational enhancements (parks and river trails)	*Yes or No*		No				Yes	5.4				
	Visibility and Aesthetics along Creek (private residential properties)-maintain creek living			No				Yes	5.6				
	Improve condition of parks	*potential to improve park amenities?*		No		replace in kind		Yes	4.8				
D2 Minimize Inconvenience to Public - Permanent Project										4.3	3		38
	Permanent Loss of Parking	*Reduce parking spaces?*		Yes		stay same		increase	4.0				
	Negative impacts to residential properties immediately adjacent to creek (river life)	*change character of creek living?*		Yes permanently		temporary impacts		No	4.4				
	Negative impacts to critical facilities (emergency response): fire, police, hospitals, city hall	*Yes or No*		Yes		same		improve	4.4				
D3 Minimize Inconvenience to Public - Temporary										4.5	2		27
	Ability to provide temporary facilities during construction	*Facility open during construction?*		No		phase for partial use		Yes	4.4				
	Residents affected by construction	*Construction immediately adjacent to homes*		Yes		across street		No	3.2				
	Will temporary lane /road closures be required during construction?			Yes				No	6.0				
	Minimize truck trips	*Based on excavated volume (see A1)*		largest volume		NA		smallest volume	4.4				
E. Optimize Schedule												2	
E1 Minimize Coordination/Schedule Requirements										4.3	2		17
	Permanently Require Change in Land Use	*Yes or No*		Yes		Shared use		No	4.4				
	School District Coordination Required	*Yes or No*		Yes		willing to consider		No	4.8				
	Division of Dam Coordination Required	*Yes or No*		Yes, large impoundment		yes, small impoundment		No	3.2				
	Resource Agencies Required	*Yes or No*		Fed permit		State permit		No	3.4				
	Private Owner Coordination Required	*Yes or No*	Condemnation	Yes full acquisition		Yes, TCE		No	5.8				

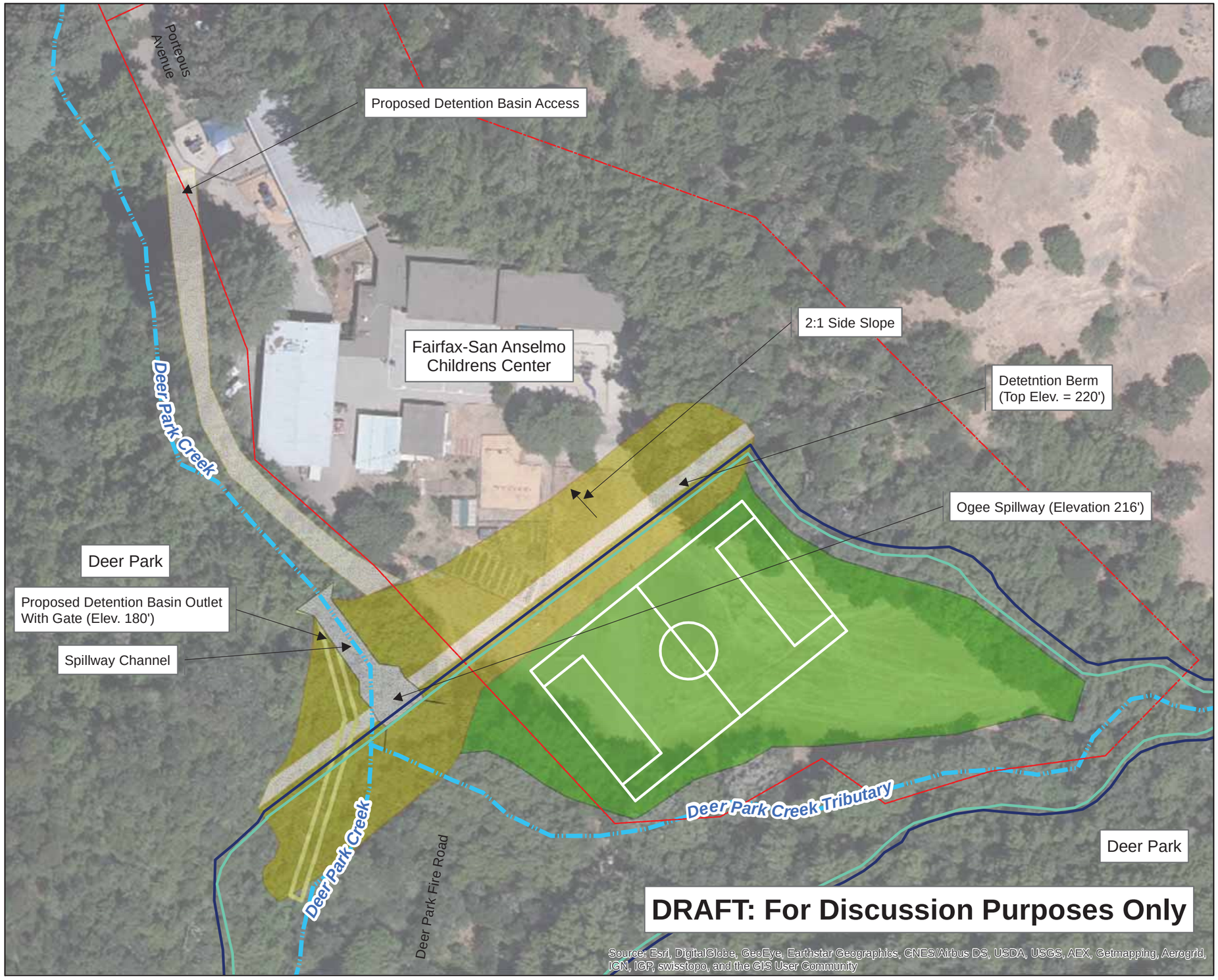
Appendix B
Flow Reducing Element Summary Sheet

Table B-1. Flow Reducing Element Summary Sheet

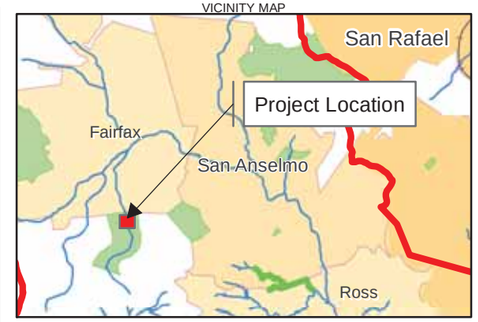
Ross Valley Flood Protection and Watershed Program

Alternative Designator	Alternative Name	Criteria															
		A1 Maximize Flow Reduction Benefit	B1 Minimize Environmental Impacts	B2 Maximize Environmental Enhancements	B3 Increase Ability to Obtain Permits	C1 Minimize Local Economic Impacts	C2 Minimize Operation and Maintenance Requirements	C3 Maximize Construction Feasibility	C4 Minimize Project Cost	C5 Maximize Funding Opportunities	D1 Address Public Concerns	D2 Minimize Inconvenience to Public - Permanent	D3 Minimize Inconvenience to Public - Temporary	E1 Minimize Coordination/ Schedule Requirements	Total Score	Ranking	Notes
5	Phoenix Lake	131	85	24	100	54	32	36	53	54	47	48	30	18	711	1	
3	Memorial Park	76	85	48	120	48	21	32	52	54	40	36	25	19	654	2	
R	Deer Park	77	75	72	80	48	27	24	43	36	43	48	28	14	616	3	
M	Nursery near Baywood Canyon Drive and SFD	77	82	60	80	54	29	32	43	36	43	36	28	14	614	4	
1	Lefty Gomez Field	80	82	36	80	48	24	28	43	36	43	36	25	15	576	5	
L	Camp Bothin Detention Facility	67	69	66	60	42	29	30	48	36	40	42	29	14	571	6	
Q1	San Domenico School Upstream	82	73	60	60	48	26	22	43	36	29	48	33	12	571	7	
W1	Marin Town Country Club Detention Pond	133	78	24	80	36	24	28	29	36	36	30	18	11	563	8	
4	Red Hill Park	57	85	36	80	36	21	28	54	45	36	36	29	19	562	9	Site recently improved
O	Hidden Valley Elementary School	58	96	24	80	42	24	22	54	36	43	42	23	15	559	10	
N	Manor Elementary School	56	87	24	80	42	24	28	54	36	43	42	26	15	557	11	
P	Brookside Elementary School	53	96	24	80	42	24	22	54	36	43	42	24	15	555	12	
S	Marin Stables (Woodland Horse Stables)	54	78	60	80	33	24	24	45	36	43	36	26	14	553	13	
2	Loma Alta	56	73	66	60	48	27	26	45	36	38	36	26	14	551	14	
Q2	San Domenico Ball Field Pond	53	87	36	80	42	24	26	45	36	43	36	24	14	546	15	
W2	Marin Town & Country Club Underground Cistern	81	87	24	80	54	15	32	34	36	29	36	22	15	544	16	
V	Camp Tamarancho Lake	57	78	24	80	42	27	24	45	36	40	36	29	11	528	17	
T	Pine Mountain Tunnel	50	69	24	80	54	21	20	45	27	36	48	36	11	520	18	
J	Implement LID Provisions (not shown on map)	0	87	24	120	42	18	30	51	27	36	39	27	16	517	19	
K	Underground Parking Detention (not shown on map)	53	82	24	80	48	15	30	42	27	22	36	27	16	501	20	Has a fatal flaw. This alternative could result in trapped persons and property damage when flooded.
I	Flood proofing (not shown on map)	0	82	24	120	30	18	36	53	27	29	36	24	21	500	21	
A	Creek Widening through San Anselmo	0	69	72	40	36	35	24	45	36	50	36	26	16	485	22	
B2	Bypass Conduit Along San Anselmo Avenue	0	78	24	80	48	36	30	39	36	36	36	21	21	484	23	
B1	Bypass Conduit through San Anselmo Along Cedar Street	0	78	24	80	48	36	30	38	36	36	36	21	21	483	24	
D	Bypass Conduit through Fairfax	0	78	24	80	48	36	30	39	27	36	36	21	21	476	25	
C	Bypass Conduit through Ross	0	78	24	80	48	36	30	38	27	36	36	21	21	474	26	
G	Utilize Surface Streets for Conveyance (not shown on map)	0	69	24	80	48	33	32	48	27	32	30	20	24	467	27	
H	Purchase flood prone properties (not shown on map)	0	82	24	120	30	21	36	30	27	29	24	24	14	462	28	
U	Detention Facilities along Cascade Creek	88	64	24	0	54	30	24	51	18	36	30	27	14	460	29	Has a fatal flaw. This has been identified as sensitive habitat for fish and permits will not be able to be obtained to dam the creek.
F	Setback Levees at Hal Brown Park at Creekside	0	64	24	60	48	26	28	29	27	29	30	30	14	408	30	
E	Setback Levees at A.E. Kent Middle School	0	64	24	60	30	26	28	24	27	29	30	27	11	379	31	

Appendix C
Conceptual Designs



VICINITY MAP



LEGEND

- Normal WSEL (Elev. = 216')
- Maximum WSEL (Elev. = 218')
- Proposed Sports Fields
- Property Lines
- Stream Centerlines
- Detention Basin Berm (Fill)
- Outlet Culvert With Gate
- Ogee Spillway
- Proposed Open Field Area (Cut)
- Detention Basin Access

K

Detention Basin Estimated Quantities		
Elevations		
Bottom Elev	*188.0 Feet*	
Top of Berm Elev	*220.0 Feet*	
Spillway Elev	*216.0 Feet*	
Normal WSE	*216.0 Feet*	
Maximum WSE	*218.0 Feet*	
Freeboard		
To Normal WSE	*4.0 Feet*	
To Maximum WSE	*2.0 Feet*	
Areas		
Bottom Area	*0.01 Acres*	
At Normal WSE	*7.03 Acres*	
At Maximum WSE	*7.72 Acres*	
Capacity		
At Normal WSE	*74.61 Acre-Feet*	
Earthwork Estimated Quantities		
Cut	*0 CY*	
Fill	*28,040 CY*	
Net	*28,040 CY*	*(Fill)*

0 15 30 60 90 120
Feet

Deer Park Detention Basin Concept
Ross Valley Flood Protection and Watershed Program

CH2MHILL

N

W E

S

SCALE (FEET)

0 100

1" = 100'

LEGEND:

- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOUR
- SPILLWAY CREST WSE (217')
- MAXIMUM WSE (218.5')
- PROPOSED SUBDRAIN

NOTES:

1. Base map provided by Marin County Flood Control and Water Conservation District.
2. Vertical datum is NAVD88.

ACCESS ROAD

(E) IRRIGATION WATER TANK TO REMAIN, FLOOD-PROOF TO EL. 219.5

CONCRETE WALL (TOP ELEV=220.0')

(E) 30" W TO REMAIN

CONCRETE STEPS

RAISE (E) TRANSFORMER ABOVE EL. 219.5

DEMOLISH (E) STRUCTURES (3) AND REPLACE IN-KIND WITH FLOORS AT ELEV. 219.5 AND ADA ACCESS RAMPS

(N) GRINDER SS P.S, FLOOD-PROOF TO EL. 219.5

GLEN DR

ACCESS ROAD (NOT REFLECTED IN GRADING)

CONCRETE WALL

CATCH BASIN

10' CREST WIDTH. SLOPE 2.5(H):1(V) ELEV = 220'

OUTLET CULVERTS W/GATE AND UNGATED

SLOPE PROTECTION

(E) RESTROOM

SEE DETAIL 1

MAIDEN LN

(N) 4" SS FM

(E) PORTABLE BLEACHERS

GRADING BOUNDARY

(E) STORAGE

(E) SNACK BAR

(2) BASKETBALL COURTS (AC)

RCP OUTLET CULVERT W/ GATE

ABANDON (E) WELLS

(N) IRRIGATION WELL

ACCESS RAMP (NOT REFLECTED IN GRADING)

REMOVE (E) 8" SS

BATTING CAGE

EXCAVATION SLOPE 3(H):1(V)

(E) 6" SS

PLUG SS

BASEBALL DIAMOND

SUBDRAIN SYSTEM 10' O.C.

MAXIMUM WSE (ELEV=218.5')

SPILLWAY CREST WSE (ELEV=217.0')

INSIDE DIKE SLOPE 3(H):1(V)

DIKE CREST (ELEV=220.0')

SHERMAN CT

SHADOW CREEK CT

0.1% Slope (Typ)

BASEBALL DIAMOND

SOCCER FIELD

REMOVE (E) 6" SS

OUTSIDE DIKE SLOPE 3(H):1(V)

(E) 8" SS

(E) 6" SS

PLUG SS

(N) 8" SS

SIR FRANCIS DRAKE BLVD

(N) 8" SS

(N) 8" SS

INTAKE STRUCTURE

OUTLET CONDUIT 6'x4'

SPILLWAY

STILLING BASIN

OUTLET CONDUIT 10'x7' w/GATE

DETAIL 1

SCALE (FEET)

0 30

1" = 30'

URS 1333 Broadway, Suite 800 Oakland, CA 94612 Tel. (510) 893-3600 Fax: (510) 874-3268	Project No. 26819046 MARIN COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	LEFTY GOMEZ FIELD DETENTION BASIN DRAFT CONCEPTUAL PLAN VIEW	FIGURE 6-1

\\baofpp01\Proj\MarinCoFCD\496599RossValley\Appendices\Appendix B - Conceptual Designs\LGDB conceptual design 2014-04-23.dwg

Figure 6

SCALE (FEET) 0 50 100

Earthwork Estimated Quantities

Cut	117,080	CY
Fill	4,720	CY
Net	112,360	CY (Excavation)

Detention Basin Estimated Quantities

Elevations	
Bottom Elev	60.0 Feet
Top of Dam Elev	79.0 Feet
Spillway Crest WSE	76.0 Feet
Maximum WSE	77.0 Feet
Freeboards to Top of Dam	
@ Spillway Crest WSE	3.0 Feet
@ Maximum WSE	2.0 Feet
Areas	
Bottom Area	4.37 Acres
@ Spillway Crest WSE	5.86 Acres
@ Maximum WSE	6.00 Acres
Capacities	
@ Spillway Crest WSE	81.92 Acrefeet
@ Maximum WSE	87.87 Acrefeet
Others	
Low Flow Channel	550 Feet
Access Ramp	130 Feet

LEGEND:

- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- SPILLWAY CREST WSE (76')
- MAXIMUM WSE (77')

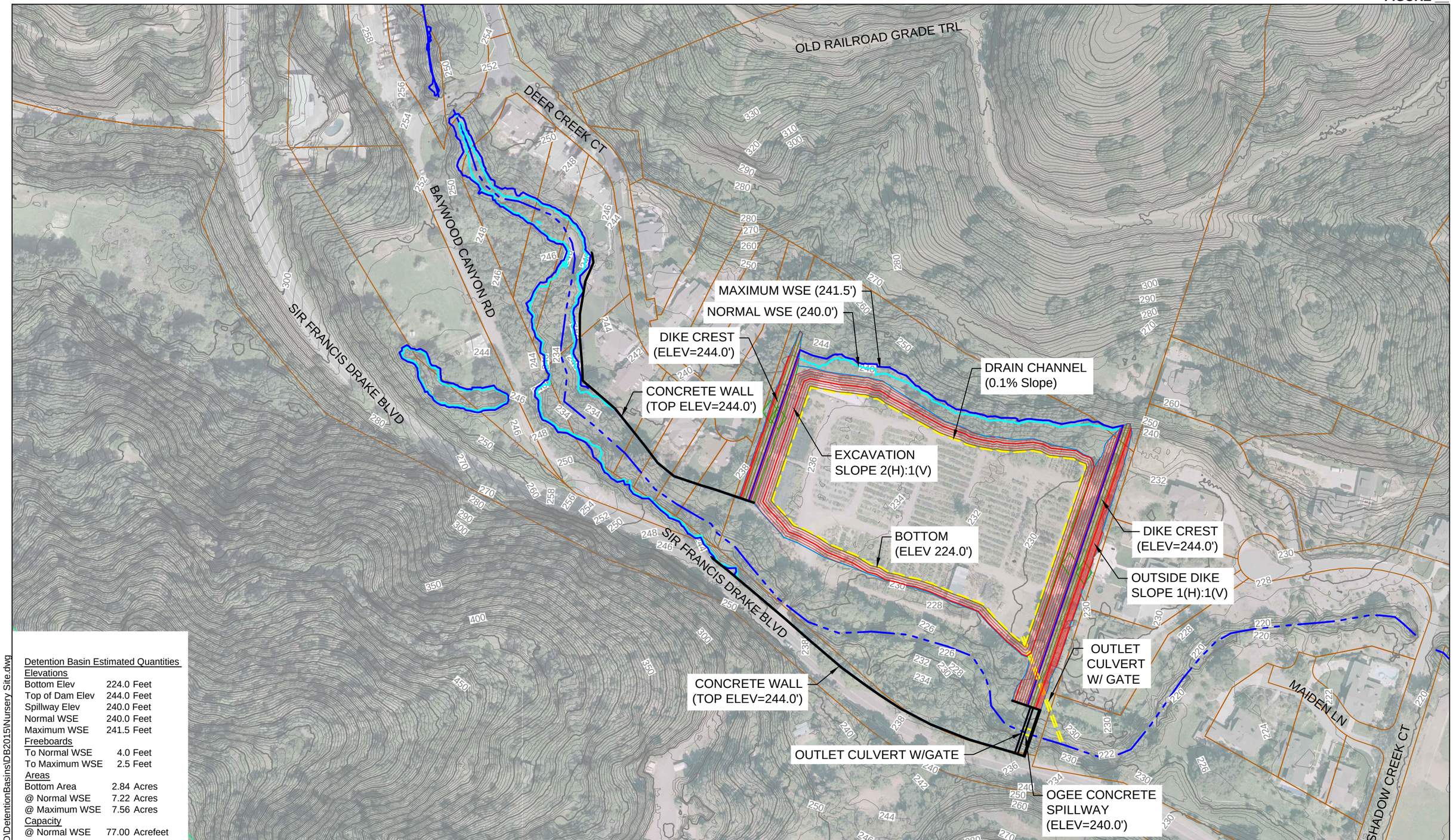
Notes:

1. Source of topography is LIDAR survey by Delta Geomatics, September 2009.
2. Source of aerial photo is Marin County, 2004.
3. Vertical datum is NAVD88.

Date: 01/27/2011

MEMORIAL PARK DETENTION BASIN PLAN VIEW

FIGURE __



Detention Basin Estimated Quantities

Elevations		
Bottom Elev	224.0	Feet
Top of Dam Elev	244.0	Feet
Spillway Elev	240.0	Feet
Normal WSE	240.0	Feet
Maximum WSE	241.5	Feet
Freeboards		
To Normal WSE	4.0	Feet
To Maximum WSE	2.5	Feet
Areas		
Bottom Area	2.84	Acres
@ Normal WSE	7.22	Acres
@ Maximum WSE	7.56	Acres
Capacity		
@ Normal WSE	77.00	Acrefeet

Earthwork Estimated Quantities

Cut	46,450	CY
Fill	7,660	CY
Net	38,790	CY (Excavation)

Notes:
1. Source of topography is LIDAR survey by Delta Geomatics, September 2009.
2. Aerial Photo Shown is 2004 Aerial Photo received from The County.
3. Parcel boundaries are based on the shape files downloaded from The County website.
4. Coordinates of this drawing is in California State Planes, NAD83, zone 3.
5. Vertical Datum in this drawing is NAVD88.

LEGEND:
- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- PARCEL LINE
- EXISTING CREEK

N / W / E / S

SCALE (FEET)
0 75 150

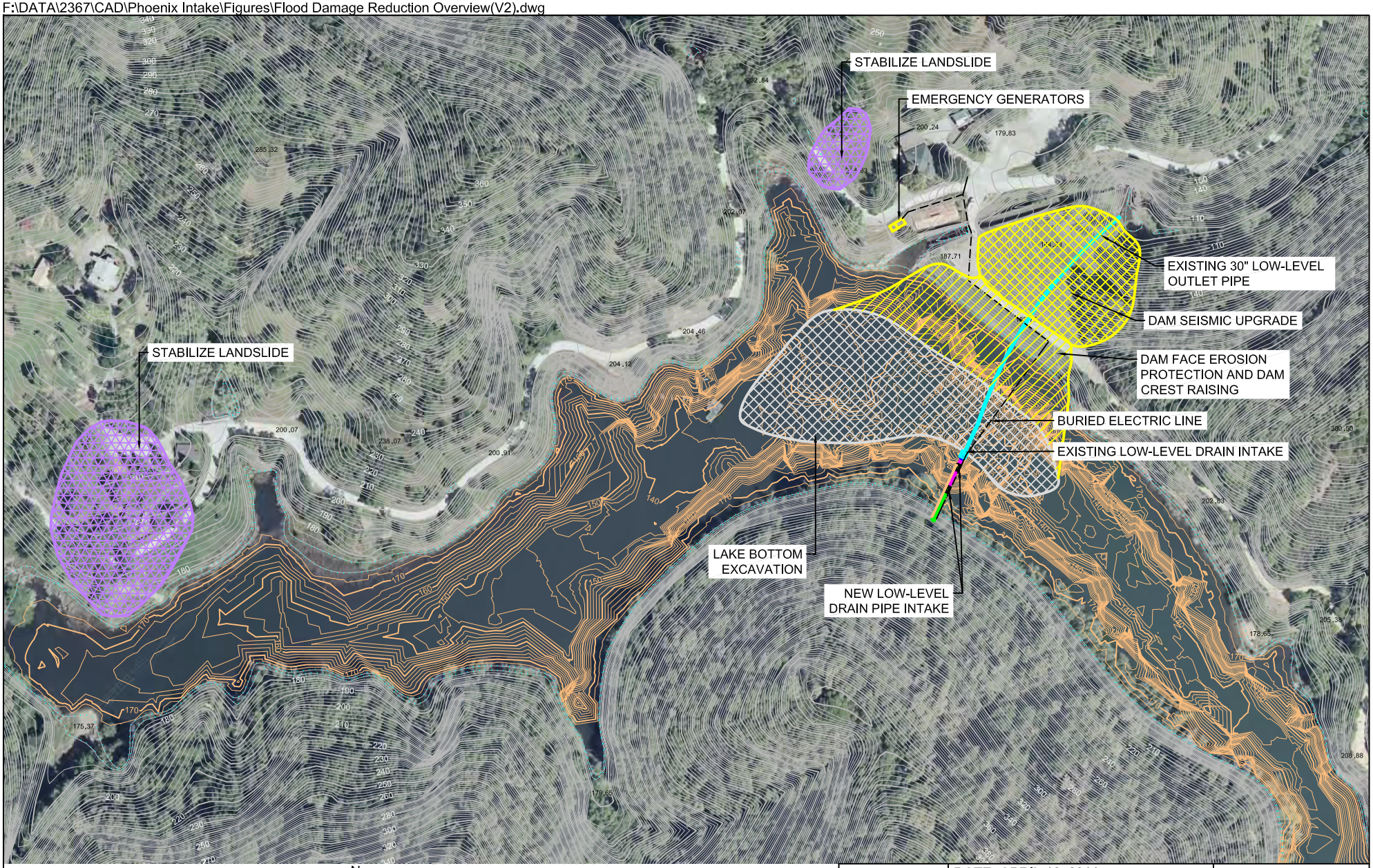
STETSON ENGINEERS INC.

DATE: APRIL 24, 2015 | JN:

NURSERY SITE DETENTION BASIN

F:\DATA\2431\AutoCAD\DetentionBasins\DB2015\Nursery Site.dwg

F:\DATA\2367\CAD\Phoenix Intake\Figures\Flood Damage Reduction Overview(V2).dwg



LEGEND

CONTOUR LINES (2 FOOT INTERVAL)

BATHYMETRIC CONTOUR LINES (2 FOOT INTERVAL)

179.16 SPOT ELEVATION

N
W E
S

SCALE (FEET)
0 110 220

Notes:

1. This drawing is in California State Plane NAD 83, zone 3 and vertical datum NGVD 29.
2. Bathymetry data points source is XYZ file data received from Environmental Data Solutions in November 2009.
3. 2' Interval Contourlines and Spot Elevations are based on the 2004 aerial survey contour data received from Marin County.

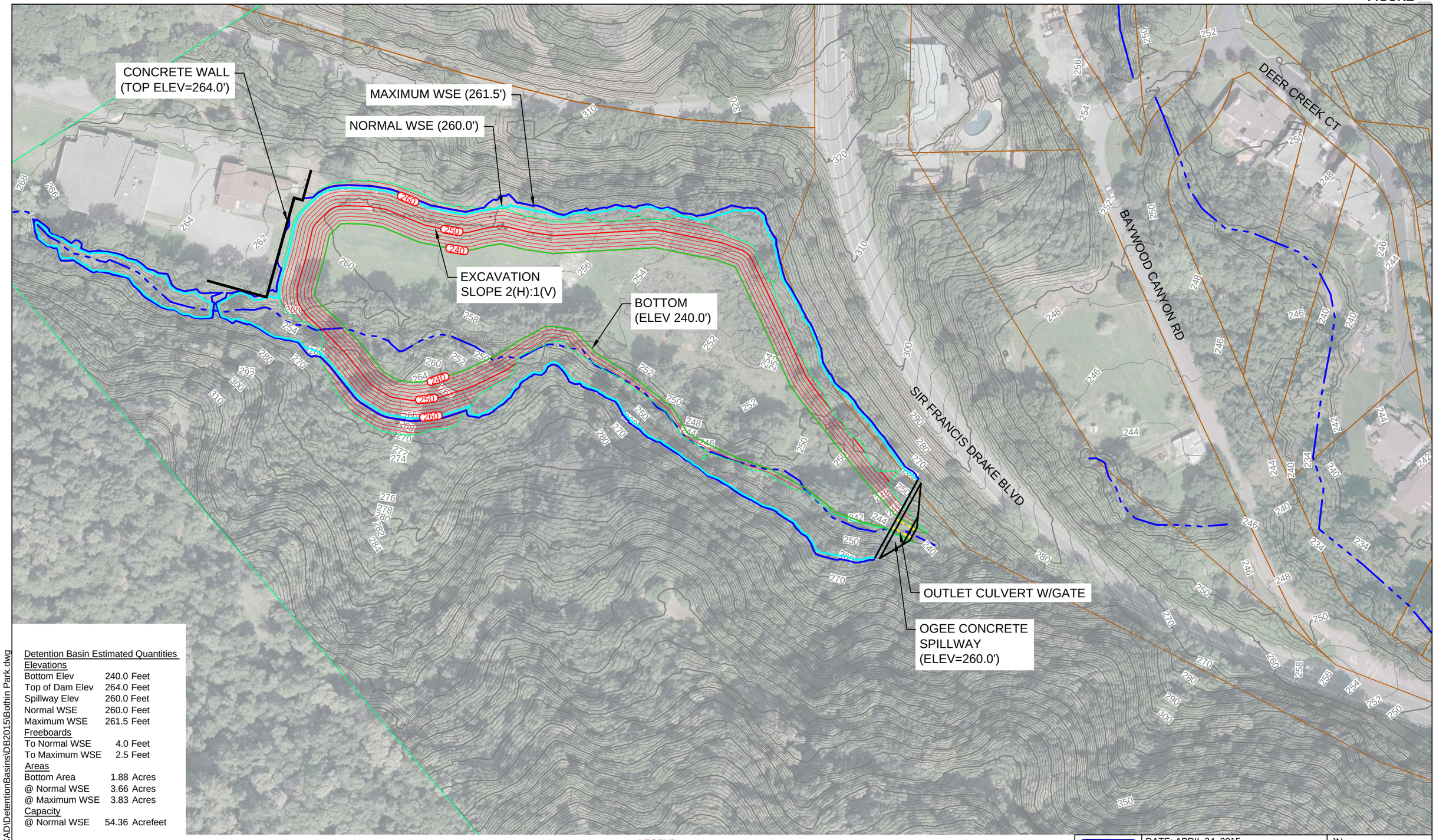
STETSON ENGINEERS INC.

DATE: APRIL 12, 2011 | JN: 2367

FLOOD DAMAGE REDUCTION
PHOENIX LAKE

FIGURE 1

FIGURE __



Detention Basin Estimated Quantities

Elevations		
Bottom Elev	240.0	Feet
Top of Dam Elev	264.0	Feet
Spillway Elev	260.0	Feet
Normal WSE	260.0	Feet
Maximum WSE	261.5	Feet
Freeboards		
To Normal WSE	4.0	Feet
To Maximum WSE	2.5	Feet
Areas		
Bottom Area	1.88	Acres
@ Normal WSE	3.66	Acres
@ Maximum WSE	3.83	Acres
Capacity		
@ Normal WSE	54.36	Acrefeet

Earthwork Estimated Quantities

Cut	56,430	CY
Fill	0	CY
Net	56,430	CY (Excavation)

Notes:
1. Source of topography is LIDAR survey by Delta Geomatics, September 2009.
2. Aerial Photo Shown is 2004 Aerial Photo received from The County.
3. Parcel boundaries are based on the shape files downloaded from The County website.
4. Coordinates of this drawing is in California State Planes, NAD83, zone 3.
5. Vertical Datum in this drawing is NAVD88.

LEGEND:
- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- PARCEL LINE
- EXISTING CREEK

N / W / E / S

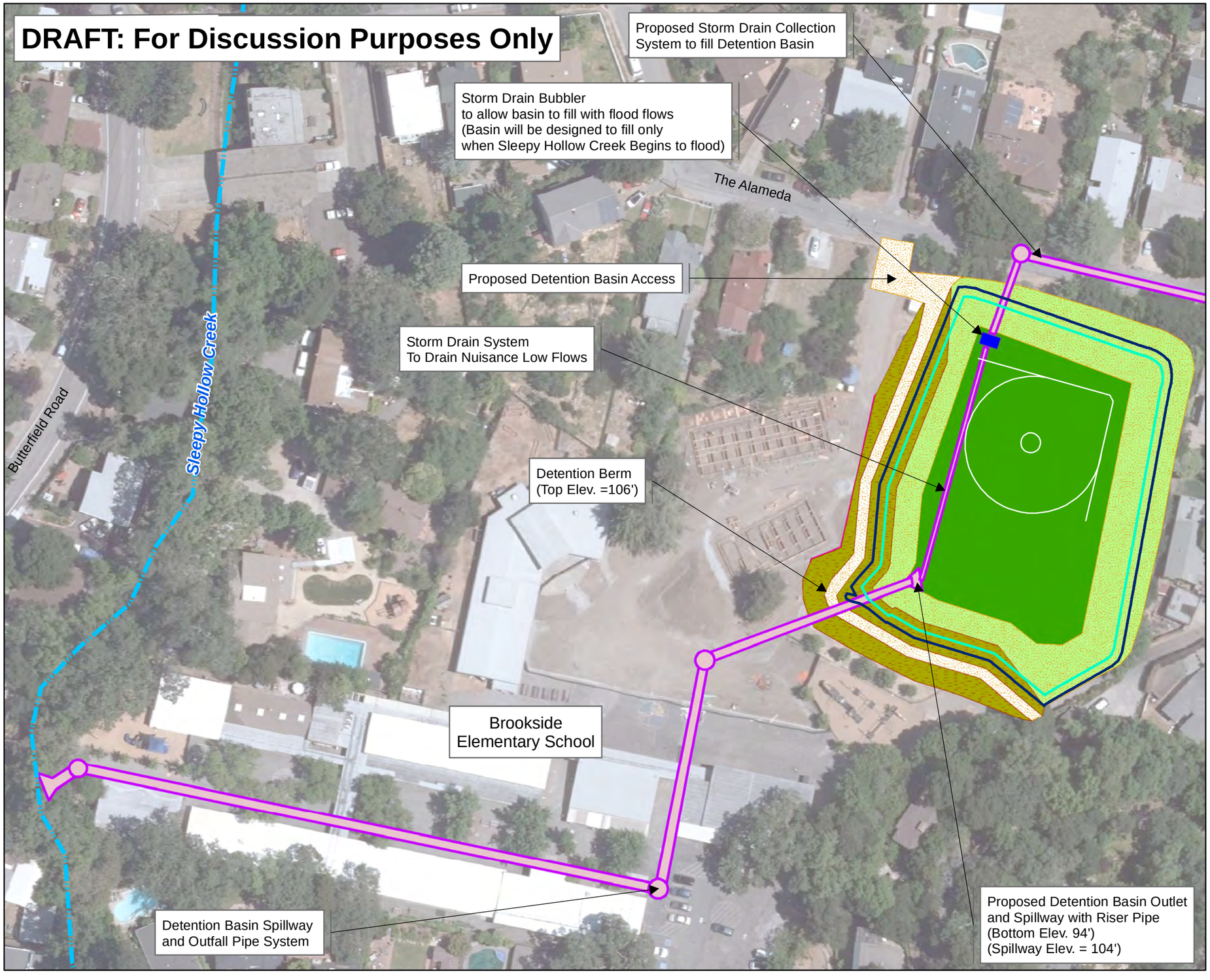
SCALE (FEET)
0 50 100

STETSON ENGINEERS INC.

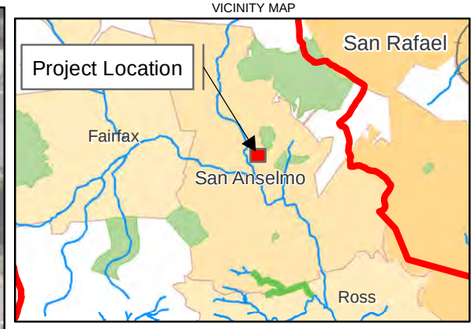
DATE: APRIL 24, 2015 | JN:

CAMP BOTHIN DETENTION BASIN

F:\DATA\2431\AutoCAD\DetentionBasins\DB2015\Bothin Park.dwg



VICINITY MAP



LEGEND

- Stream Centerlines
- Normal WSEL (Elev. = 102')
- Maximum WSEL (Elev. = 104')
- Proposed Sports Field
- Proposed Stormwater Collection System
- Bubbler Outfall
- Detention Basin Berm (Fill)
- Retaining Wall
- Detention Basin Bottom
- Detention Basin Side Slope (Cut)
- Detention Basin Access

N

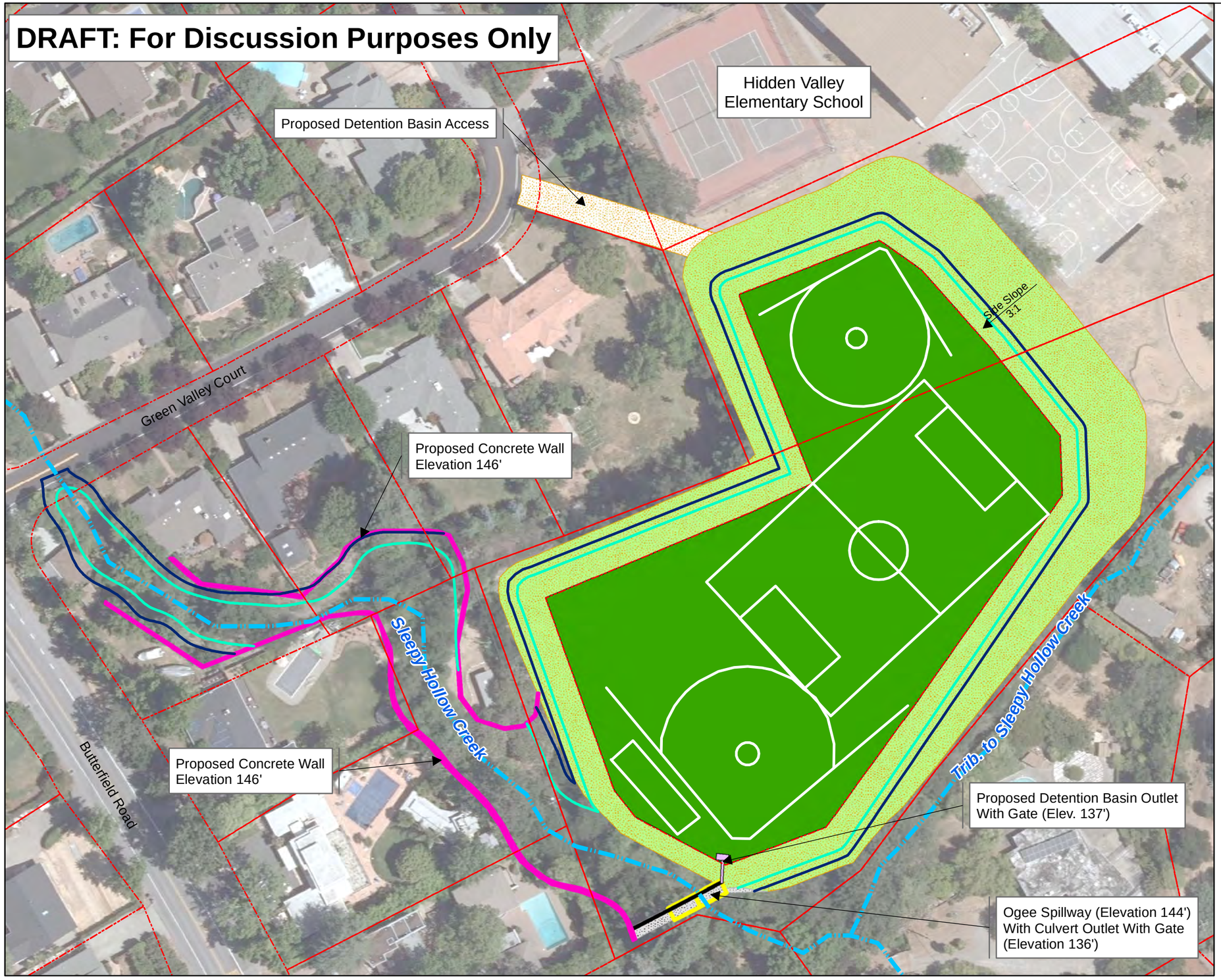
Detention Basin Estimated Quantities		
Elevations		
Bottom Elev	94.0 Feet	
Top of Berm Elev	106.0 Feet	
Normal WSE	102.0 Feet	
Maximum WSE	104.0 Feet	
Freeboard		
To Normal WSE	4.0 Feet	
To Maximum WSE	2.0 Feet	
Areas		
Bottom Area	0.560 Acres	
At Normal WSE	0.910 Acres	
At Maximum WSE	1.02 Acres	
Capacity		
At Normal WSE	4.34 Acre-Feet	
Earthwork Estimated Quantities		
Cut	13,232 CY	
Fill	1,187 CY	
Net	12,044 CY	(Excavation)

0 15 30 60 90 120
Feet

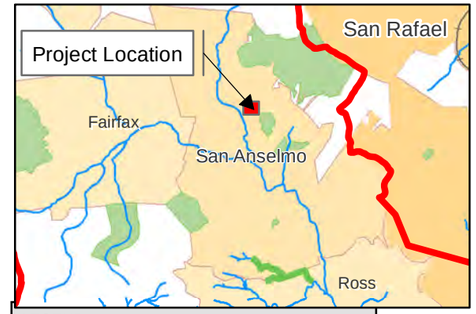
Brookside Detention Basin Concept with Collection System
Ross Valley Flood Protection and Watershed Program

CH2MHILL

DRAFT: For Discussion Purposes Only



VICINITY MAP



LEGEND

- Stream Centerlines
- Proposed Sports Fields
- Property Lines
- Normal WSEL (Elev. = 142')
- Maximum WSEL (Elev. = 144')

Hidden Valley Detention Basin Design

- Retaining Wall
- Basin Outfall Culvert With Riser
- Spillway Crest (Elev. = 144')
- Outlet Culvert With Gate
- Ogee Spillway
- Detention Basin Bottom
- Basin Side Slope (Cut)
- Proposed Basin Access

N

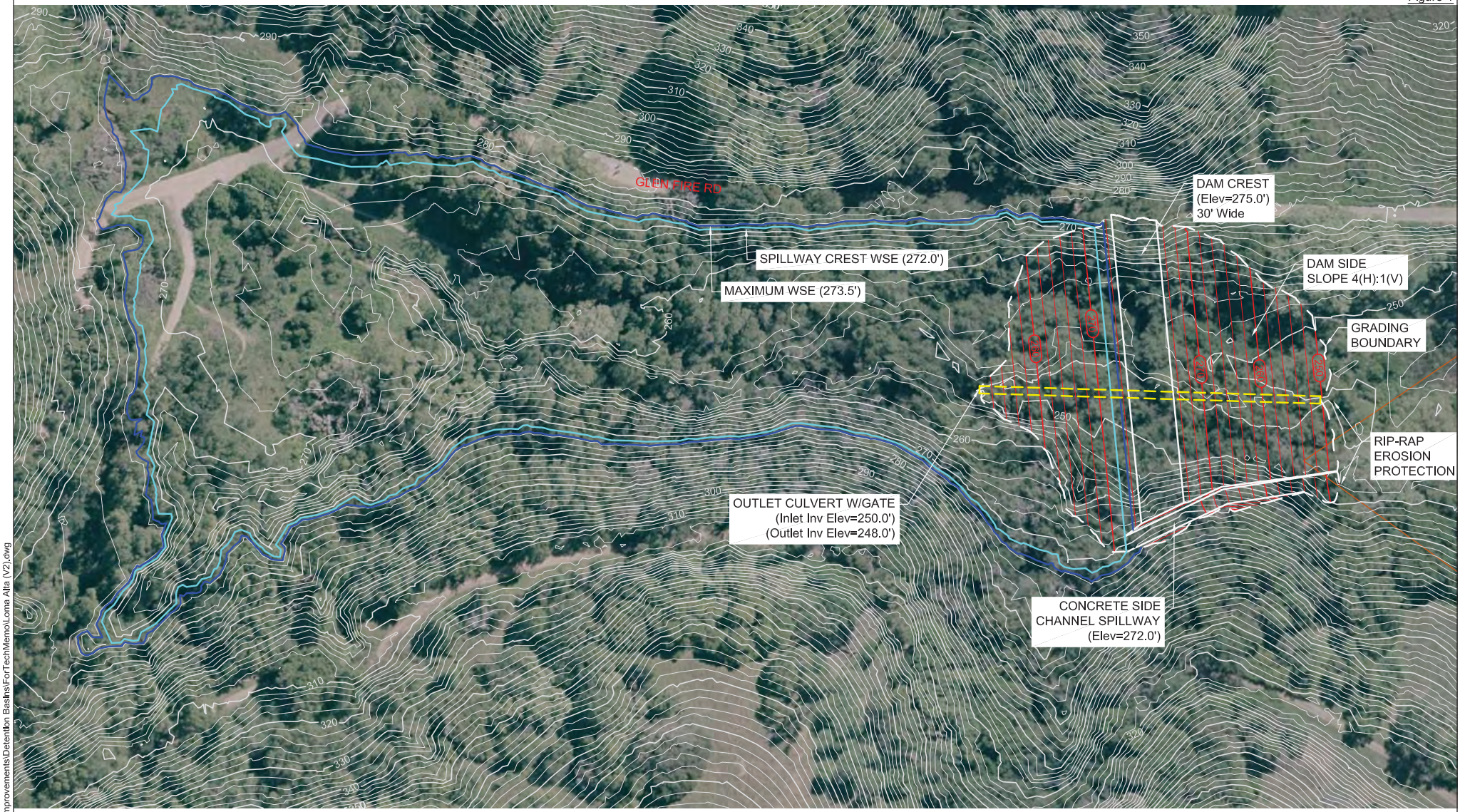
Detention Basin Estimated Quantities		
Elevations		
Bottom Elev	*138.0 Feet*	
Top of Berm Elev	*146.0 Feet*	
Spillway Elev	*142.0 Feet*	
Normal WSE	*142.0 Feet*	
Maximum WSE	*144.0 Feet*	
Freeboard		
To Normal WSE	*4.0 Feet*	
To Maximum WSE	*2.0 Feet*	
Areas		
Bottom Area	*2.00 Acres*	
At Normal WSE	*2.915 Acres*	
At Maximum WSE	*3.260 Acres*	
Capacity		
At Normal WSE	*12.04 Acre-Feet*	
Earthwork Estimated Quantities		
Cut	*54,219 CY*	
Fill	*0 CY*	
Net	*54,219 CY*	*(Excavation)*

0 15 30 60 90 120 Feet

Hidden Valley Detention Basin Concept
Ross Valley Flood Protection and Watershed Program

CH2MHILL

Figure 4



Detention Basin Estimated Quantities

Elevations

Bottom Elev	250.0 Feet
Top of Dam Elev	275.0 Feet
Spillway Crest WSE	272.0 Feet
Maximum WSE	273.5 Feet

Freeboards to Top of Dam

@ Spillway Crest WSE	3.0 Feet
@ Maximum WSE	1.5 Feet

Areas

@ Spillway Crest WSE	3.00 Acres
@ Maximum WSE	3.24 Acres

Capacities

@ Spillway Crest WSE	24.93 Acrefeet
@ Maximum WSE	29.63 Acrefeet

Earthwork Estimated Quantities

Cut	0	CY
Fill	16,740	CY
Net	16,740	CY (Fill)

LEGEND:

- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- SPILLWAY CREST WSE (272')
- MAXIMUM WSE (273.5')

Notes:

1. Source of topography is LIDAR survey by Delta Geomatics, September 2009.
2. Source of aerial photo is Marin County, 2004.
3. Vertical datum is NAVD88.

N

SCALE (FEET)

0 15 30 60

Date: 01/27/2011

LOMA ALTA TRIBUTARY DETENTION BASIN

PLAN VIEW

F:\DATA\2292\AutoCAD\Improvements\Detention Basins\ForTechMemo\Loma Alta (V2).dwg

Figure 7

DIVERSION GATE

ESTIMATED EXISTING CULVERT

SLOAN HILLS DR

PROPOSED OUTLET CULVERT (Inlet Inv Elev=80') (Outlet Inv Elev=64')

PROPOSED SPILLWAY SEMI CIRCLE GLORY HOLE TYPE (ELEV=89.5')

INSIDE DIKE SLOPE 2(H):1(V)

OUTSIDE DIKE SLOPE 1(H):1(V)

DIKE CREST (ELEV=92')

MAXIMUM WSE (90.5')

SPILLWAY CREST WSE (89.5')

SCALE (FEET)

0 50 100

Earthwork Estimated Quantities

Cut	0	CY
Fill	5,350	CY
Net	5,350	CY (Fill)

Detention Basin Estimated Quantities

Elevations

Bottom Elev. from 80.0 to 86.0 Feet	
Top of Dam Elev.	92.0 Feet
Spillway Crest WSE	89.5 Feet
Maximum WSE	90.5 Feet

Freeboards to Top of Dam

@ Spillway Crest WSE	2.5 Feet
@ Maximum WSE	1.5 Feet

Areas

Bottom Area	3.80 Acres
@ Spillway Crest WSE	4.38 Acres
@ Maximum WSE	4.45 Acres

Capacities

@ Spillway Crest WSE	26.31 Acrefeet
@ Maximum WSE	32.71 Acrefeet

LEGEND:

- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- SPILLWAY CREST WSE (89.5')
- MAXIMUM WSE (90.5')

Notes:

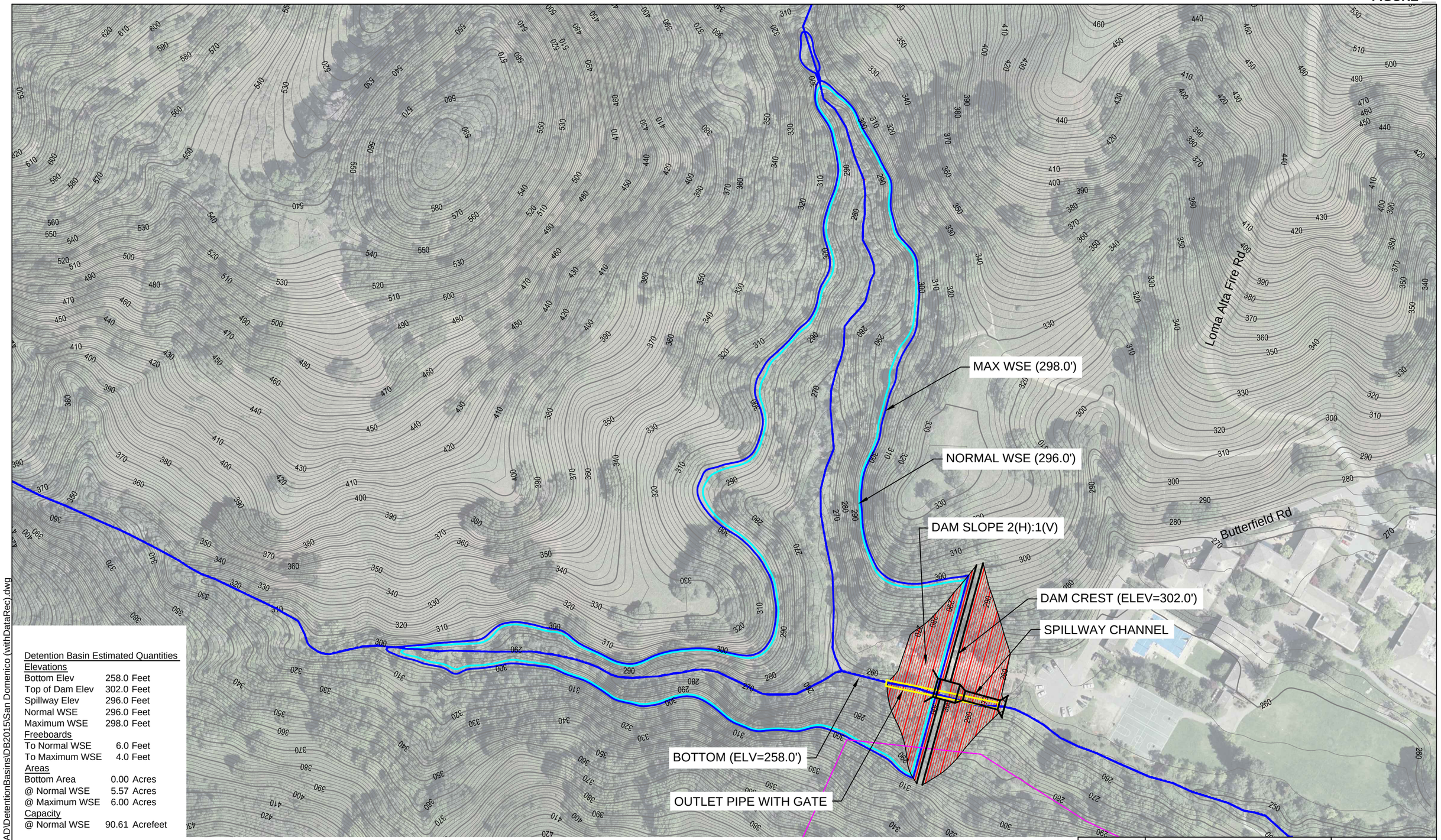
1. Source of topography is LIDAR survey by Delta Geomatics, September 2009.
2. Source of aerial photo is Marin County, 2004.
3. Vertical datum is NAVD88.

Date: 01/27/2011

RED HILL PARK DETENTION BASIN PLAN VIEW

F:\DATA\2009\AutoCAD Improvements\Detention Basin\Final Tech Memo\Red Hill Park.dwg

FIGURE __



Detention Basin Estimated Quantities

Elevations		
Bottom Elev	258.0	Feet
Top of Dam Elev	302.0	Feet
Spillway Elev	296.0	Feet
Normal WSE	296.0	Feet
Maximum WSE	298.0	Feet
Freeboards		
To Normal WSE	6.0	Feet
To Maximum WSE	4.0	Feet
Areas		
Bottom Area	0.00	Acres
@ Normal WSE	5.57	Acres
@ Maximum WSE	6.00	Acres
Capacity		
@ Normal WSE	90.61	Acrefeet

Earthwork Estimated Quantities

Cut	0	CY
Fill	27,375	CY
Net	27,375	CY (Fill)

Notes:

1. Existing topography shown is based on Marin Contours GDB created by The County in 2011 data.
2. Aerial Photo Shown is 2004 Aerial Photo received from The County.
3. Parcel boundaries are based on the shape files downloaded from The County website.
4. Coordinates of this drawing is in California State Planes, NAD83, zone 3.
5. Vertical Datum in this drawing is NAVD88.

LEGEND:

- EXISTING 2 FT CONTOURS
- PROPOSED 2 FT CONTOURS
- PARCEL LINE
- EXISTING CREEK

N / W / E / S

SCALE (FEET)
0 75 150

STETSON ENGINEERS INC.

DATE: MAY 1, 2015 | JN: 2431-15-02

SAN DOMENICO SCHOOL DETENTION BASIN

F:\DATA\2431\AutoCAD\DetentionBasins\DB2015\San Domenico (withDataRec).dwg

Appendix D
Cost Estimates

Cost Estimates

A summary of the cost estimates for the two proposed new detention sites is presented in Table D-1. Please note that these cost estimates were developed exclusively to compare alternatives using the same set of cost assumptions to obtain the relative difference between alternatives. These cost estimates were developed based on unit costs and quantities that are consistent with the level of effort presented in the Capital Improvement Plan study (CIP) prepared by Stetson Engineers in 2011.

CH2M developed conceptual detention basin designs and sent these conceptual designs to Stetson Engineers to analyze. Stetson Engineers modified the detention basin designs prior to completing the hydrologic modelling analysis. These modified detention basin designs are included in Appendix B of this report and are considered a part of the May 2015 technical memorandum deliverable Stetson Engineers prepared for the County titled *HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M HILL* (which is presented in Appendix E of this report). CH2M subsequently developed updated cost estimates from these modified conceptual detention basin designs that Stetson Engineers prepared. The cost estimate information presented in Table D-1 should only be used to compare relative costs between alternatives at a conceptual level and should not be used for budgeting or planning purposes until costs are confirmed by a professional cost estimator.

Table D-1. Summary of Cost Estimates for Proposed New Detention Sites

Ross Valley Flood Protection and Watershed Program

Description of Cost	Proposed New Detention Sites	
	Deer Park	Former Nursery Site
Construction Cost (conceptual design w/40% contingency)	$3,367,350	$4,324,535
Land Costs	$652,500	$3,400,000
Engineering and Permitting (20% of Sub-Total)	$673,000	$865,000
Construction Inspection (10% of Sub-Total)	$337,000	$433,000
Survey (5% of Sub-Total)	$168,000	$217,000
Geotechnical Testing and Analysis (5% of Sub-Total)	$168,000	$217,000
Environmental Protection - Fish and Wildlife Relocation (3% of Sub-Total)	$101,000	$130,000
Environmental Protection - Site Monitoring (3% of Sub-Total)	$101,000	$130,000
TOTAL	**$5,600,000**	**$9,800,000**

Notes:

1. Quantities based of conceptual design completed by Stetson Engineers in the *HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M HILL* TM prepared May 9, 2015.

2. Unit Costs reflect unit costs from estimates prepared by Stetson Engineers in 2011 and have not been confirmed by a professional cost estimator.

3. In providing opinions of cost, financial analyses, economic feasibility projections, and schedules for the Project, Contractor has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate Project cost or schedule. Therefore, Contractor makes no warranty that the Owner's actual Project costs, financial aspects, economic feasibility, or schedules will not vary from Contractor opinions, analyses, projections, or estimates.

Appendix E
HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley

HEC-HMS Hydrologic Modeling Analysis of Alternative Detention Basin Sites in Ross Valley Identified by CH2M Hill

Stetson Engineers Inc.
May 13, 2015

Background

The Ross Valley Flood Program Capital Improvement Plan (CIP) Study prepared by Stetson Engineers in 2011 identified five flood detention basins for capturing and attenuating flood flows and over 160 in-channel improvements aimed at increasing flood conveyance capacity while simultaneously improving the ecological function of Corte Madera Creek and its tributaries. These detention basins and in-channel capacity improvements work together to provide 100-year flood protection to homes and businesses in flood-prone Ross Valley. The CIP-identified five detention basins are listed below and are grouped as Alternative 0:

Alternative 0 (*Current CIP Project*)

- Lefty Gomez (in Fairfax Creek Watershed above Fairfax)
- Loma Alta (in Fairfax Creek Watershed above Fairfax)
- Memorial Park (in San Anselmo Creek Watershed above San Anselmo)
- Red Hill Park (in San Anselmo Creek Watershed above San Anselmo)
- Phoenix Lake (in Ross Creek above Ross)

CH2M Hill, under contract to the Marin County Flood Control District (District), is evaluating alternatives DB sites in the Ross Valley. According to CH2M Hill's Deliverable #2 to the District, CH2M Hill has identified additional four DB sites with high rankings and bundled these sites together with the CIP-identified five detention basins (see Figure 1 for the locations of all detention basin sites and Table 1 for the summary information) to form three new bundled alternatives, as follows:

Alternative 1 (*Highest Ranking Element*)

- Bothin Park Youth Center (in Fairfax Creek Watershed above Fairfax)
- Nursery near Baywood Canyon Drive and SFD (in Fairfax Creek Watershed above Fairfax)
- Deer Park (in San Anselmo Creek Watershed above San Anselmo)
- Memorial Park (in San Anselmo Creek Watershed above San Anselmo)
- Phoenix Lake (in Ross Creek above Ross)

Alternative 2 (*San Anselmo Option*)

- Bothin Park Youth Center (in Fairfax Creek Watershed above Fairfax)
- Nursery near Baywood Canyon Drive and SFD (in Fairfax Creek Watershed above Fairfax)
- Upstream of the San Domenico School (in Sleepy Hollow Creek Watershed above San Anselmo)
- Deer Park (in San Anselmo Creek Watershed above San Anselmo)
- Phoenix Lake (in Ross Creek above Ross)

Alternative 3 (*Most Environmental Friendly*)

- Nursery near Baywood Canyon Drive and SFD (in Fairfax Creek Watershed above Fairfax)
- Lefty Gomez (in Fairfax Creek Watershed above Fairfax)
- Deer Park (in San Anselmo Creek Watershed above San Anselmo)
- Memorial Park (in San Anselmo Creek Watershed above San Anselmo)
- Phoenix Lake (in Ross Creek above Ross)

All alternative bundles would reduce peak flow at the key breakout locations in Fairfax, San Anselmo, and Ross. Alternative 2 would additionally reduce peak flow in Sleepy Hollow Creek.

This HEC-HMS hydrologic modeling analysis was conducted by Stetson to support CH2M Hill's evaluation of the three new bundled alternatives of detention basins by quantifying their effectiveness in peak flow reduction at the following key breakout locations and comparing them with Alternative 0.

- At downstream end of Fairfax Creek;
- At San Anselmo Creek below Sorich Creek Confluence; and
- At Ross Gage.

The hydrologic modeling analysis was conducted using the Ross Valley watershed-wide HEC-HMS model developed by Stetson as documented in the CIP study report. The modeling analysis was first conducted for each individual alternative detention basin site through iterative modeling analysis to support refinement of the conceptual designs so that each detention basin was appropriately sized by fully utilizing the storage volume at each site. The modeling analysis was then conducted for the new bundled alternatives to evaluate their combined effectiveness in peak flow reduction at the key breakout locations. As in the CIP study, the HEC-HMS-calibrated flow hydrographs for the 12/31/2005 flood event (an approximate 100-year flood event) were used as the design hydrographs in this hydrologic modeling analysis.

Table 1 Summary of Detention Basins

Designator	L	M	1	2	Q	R	3	4	5
Location	Bothin Park Youth Center (Fairfax Creek)	Nursery near Baywood Drive and SFD (Fairfax Creek)	Lefty Gomez Field (Fairfax Creek)	Loma Alta Tributary (Fairfax Creek)	U/S of San Domenico School (Sleepy Hollow Creek)	Dear Park (Deer Creek)	San Anselmo Memorial Park (Sorich Creek)	San Anselmo Red Hill Park (Sorich Creek)	Phoenix Lake (Ross Creek)
Type	On-stream	On-stream	On-stream	On-stream	On-stream	On-stream	On-stream	On-stream	On-stream
Drainage Area	0.73 sq mi	1.62 sq mi	1.63 sq mi	0.18 sq mi	0.65 sq mi	0.44 sq mi	0.47 sq mi	0.15 sq mi	2.22 sq mi
Features	• Dry basin • Dam • Spillway • Low level outlet	• Dry basin • Dam • Spillway • Two box culverts as low level outlet	• Dry basin • Dam • Spillway • Two box culverts as low level outlet	• Dry basin • Dam • Spillway • Low level outlet	• Dry basin • Dam • Spillway • Low level outlet	• Dry basin • Dam • Spillway • Low level outlet	• Dry basin • Dam • Spillway • Low level outlet	• Dry basin • Dam • Spillway • Low level outlet	• Existing reservoir • Raise existing spillway from 174 ft to 180 ft • Modify the existing low-level outlet to raise the intake invert from 130 ft to 140 ft
Floodwater Storage Capacity	60 ac-ft	88 ac-ft	88 ac-ft	27 ac-ft	102 ac-ft	89 ac-ft	84 ac-ft	29 ac-ft	244 ac-ft

Notes: The detention basins in red are alternative detention basins identified by CH2M HILL. Others are the detention basins proposed in the CIP study.

Hydrologic Modeling Analysis of Individual Detention Basins

An iterative modeling analysis was conducted to support refinement of the conceptual designs initially prepared by CH2M Hill for Deer Park and San Domenico and by Stetson for Bothin Park and Nursery, so that each detention basin was appropriately sized and the storage volume at each site was fully utilized.

For the alternative detention basin at the Bothin Park Youth Center, due to the much greater inflow volume than the available storage volume, the 3.5 ft diameter low-level outlet would need to be open all the time to bypass some flows during the storm event.

For the alternative detention basins at the Deer Park and the upstream of San Domenico School, the 4 ft diameter low-level outlet was assumed open prior to the storm event but closed starting at the time of incipient flooding (t_1).

For the alternative detention basin at the Nursery near Baywood Drive and Sir Francis Drake, the conceptual design is similar to Lefty Gomez, which uses two box culvert outlets at the dam with different sizes to control the flow into the detention basin; the smaller culvert without gates is designed to be open at all times and the larger one is designed to have a gate for flood operations. The larger culvert was assumed open prior to the storm event but closed starting at the time of incipient flooding (t_1). It is worth noting that the sizing of the two box culverts would be the same for Alternatives 1 and 2, but different for Alternative 3. Under Alternatives 1 and 2, the Nursery detention basin receives reduced inflow caused by the upstream Bothin Park detention basin. Under Alternative 3, the Nursery detention basin receives natural inflow from its drainage. For Alternatives 1 and 2, the two box culverts are sized at 5.5 ft wide with 4 ft high and 9.5 ft wide with 6.5 ft high, respectively. For Alternative 3, the two box culverts are sized at 6 ft wide with 4 ft high and 10 ft wide with 7 ft high, respectively.

Similar to the Nursery detention basin, the sizing of the two box culverts at the Lefty Gomez detention basin would be different for Alternatives 3 and 0. Under Alternative 3, the Lefty Gomez detention basin receives reduced inflow caused by the upstream Nursery detention basin, thus the two box culverts designed for Alternative 3 would be smaller than Alternative 0 to allow less flow to bypass so that the storage volume of the Lefty Gomez detention basin designed for Alternative 0 could be fully utilized for Alternative 3. For Alternative 0, the two box culverts were sized at 6 ft wide with 4 ft high and 10 ft wide with 7 ft high, respectively. For Alternative 3, the two box culverts are sized at 5.5 ft wide with 3.2 ft high and 9 ft wide with 5.6 ft high, respectively. The updated conceptual designs by URS for the Lefty Gomez detention basin were used in this analysis.

The designs and operations for Memorial Park and Phoenix Lake detention basins would be the same as in the CIP study.

With above considerations, an iterative modeling analysis for individual detention basins was conducted and the final results are shown in Figures 2 to 7.

Hydrologic Modeling Analysis of Bundled Alternatives of Detention Basins

After the concept designs of individual detention basins were refined and the model simulations were performed, a hydrologic modeling analysis of the bundled alternatives was then conducted to evaluate their combined effectiveness in peak flow reduction at the key breakout locations. The results for Alternative 1 are shown in Figures 8 to 10, the results for Alternative 2 are shown in Figures 11 to 13, and the results for Alternative 3 are shown in Figures 14 to 16. Table 2 is a summary of 100-year peak flow reductions for all alternatives and Table 3 is a summary of residual 100-year flows.

Table 2 Summary of 100-Year Peak Flow Reductions for All Alternatives (cfs)

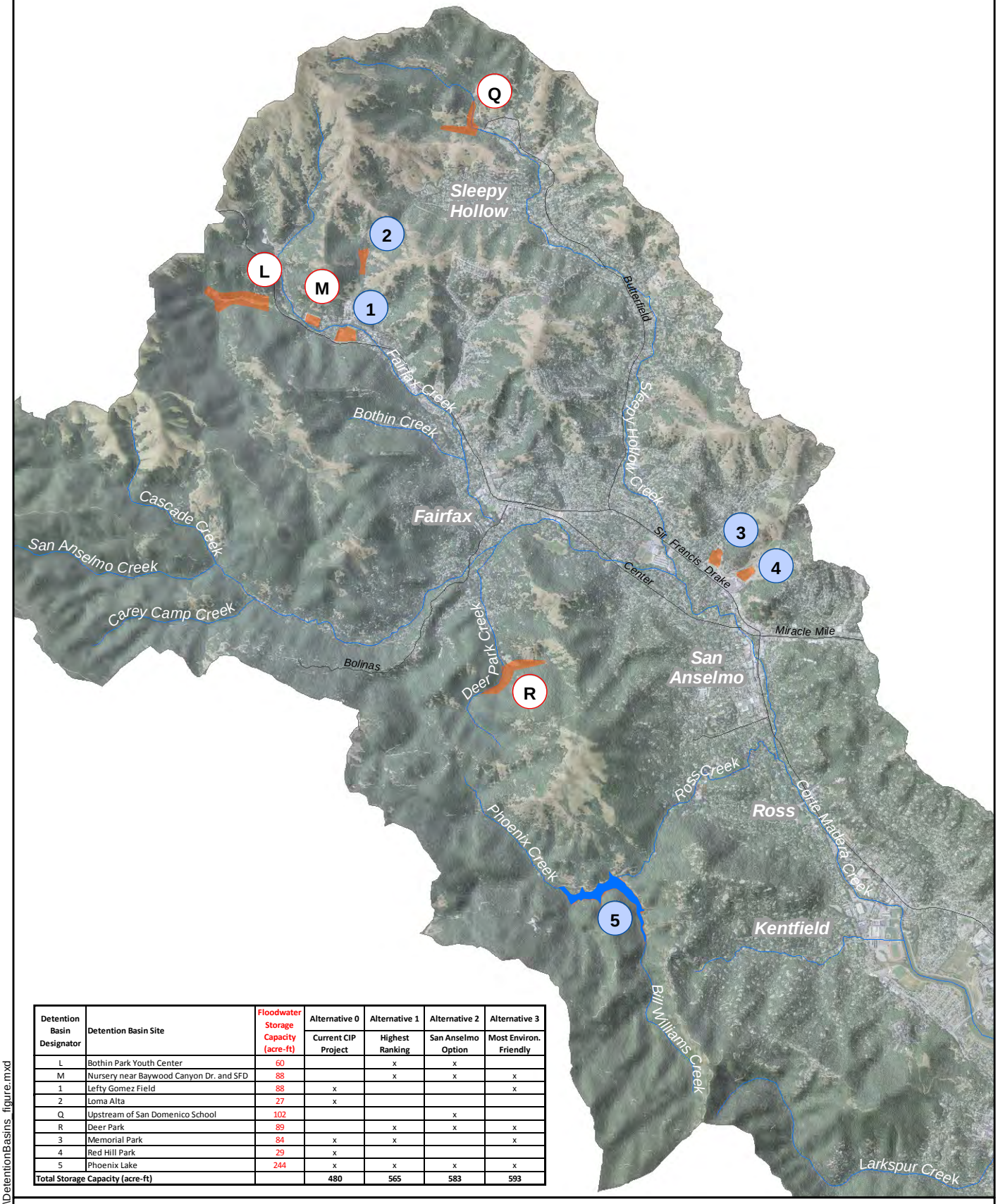
Key Breakout Locations	**Alternative 0** (Target)	**Alternative 1**	**Alternative 2**	**Alternative 3**
At downstream end of Fairfax Creek	450	393	393	551
At San Anselmo Creek below Sorich Creek Confluence	710	785	779	944
At Ross Gage	1,350	1,433	1,445	1,580

Table 3 Summary of Residual 100-Year Flows for All Alternatives (cfs)

Key Breakout Locations	**Alternative 0** (Target)	**Alternative 1**	**Alternative 2**	**Alternative 3**
At downstream end of Fairfax Creek	1,110	1,170	1,170	1,010
At San Anselmo Creek below Sorich Creek Confluence	4,540	4,470	4,470	4,310
At Ross Gage	5,540	5,460	5,450	5,310

Summary of Findings

The results in Tables 2 and 3 show that all alternatives substantially meet the flow reduction and residual flow targets. There are two minor exceptions: Alternatives 1 and 2 fall slightly short of the targets at the downstream end of Fairfax Creek by about 60 cfs. These shortfalls can be addressed during final design of channel improvements in Fairfax by modifying certain features to pass the additional 60 cfs flow, such as raising the height of floodwalls and/or enlarging the size of the Fairfax Culvert opening.



Detention Basin Designator	Detention Basin Site	Floodwater Storage Capacity (acre-ft)	Alternative 0 Current CIP Project	Alternative 1 Highest Ranking	Alternative 2 San Anselmo Option	Alternative 3 Most Environ. Friendly
L	Bothin Park Youth Center	60		x	x	
M	Nursery near Baywood Canyon Dr. and SFD	88		x	x	x
1	Lefty Gomez Field	88	x			x
2	Loma Alta	27	x			
Q	Upstream of San Domenico School	102			x	
R	Deer Park	89		x	x	x
3	Memorial Park	84	x	x		x
4	Red Hill Park	29	x			
5	Phoenix Lake	244	x	x	x	x
Total Storage Capacity (acre-ft)			480	565	583	593

STETSON ENGINEERS INC.

CIP Detention Basin Project

Alternative Detention Basion Project

Detention Basin

ROSS VALLEY DETENTION BASINS

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Figure 2 Simulated Hydrographs of Bothin Park Detention Basin During the Design Flood Event of 12/31/2005

(The designed low-level outlet open all time)

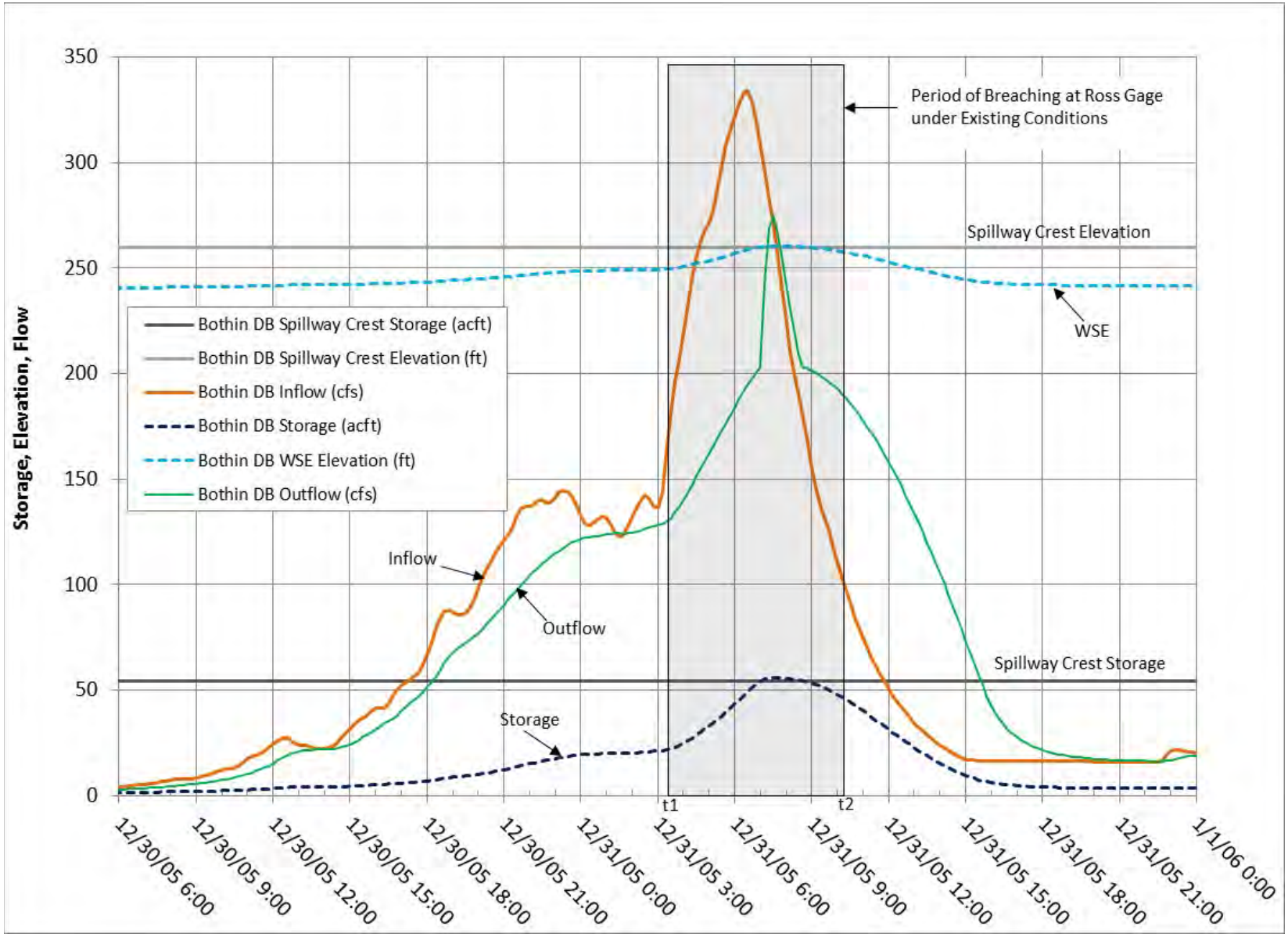

Figure 3 Simulated Hydrographs of Deer Park Detention Basin During the Design Flood Event of 12/31/2005

(The designed low-level outlet closed at the time of incipient flooding (t_1))

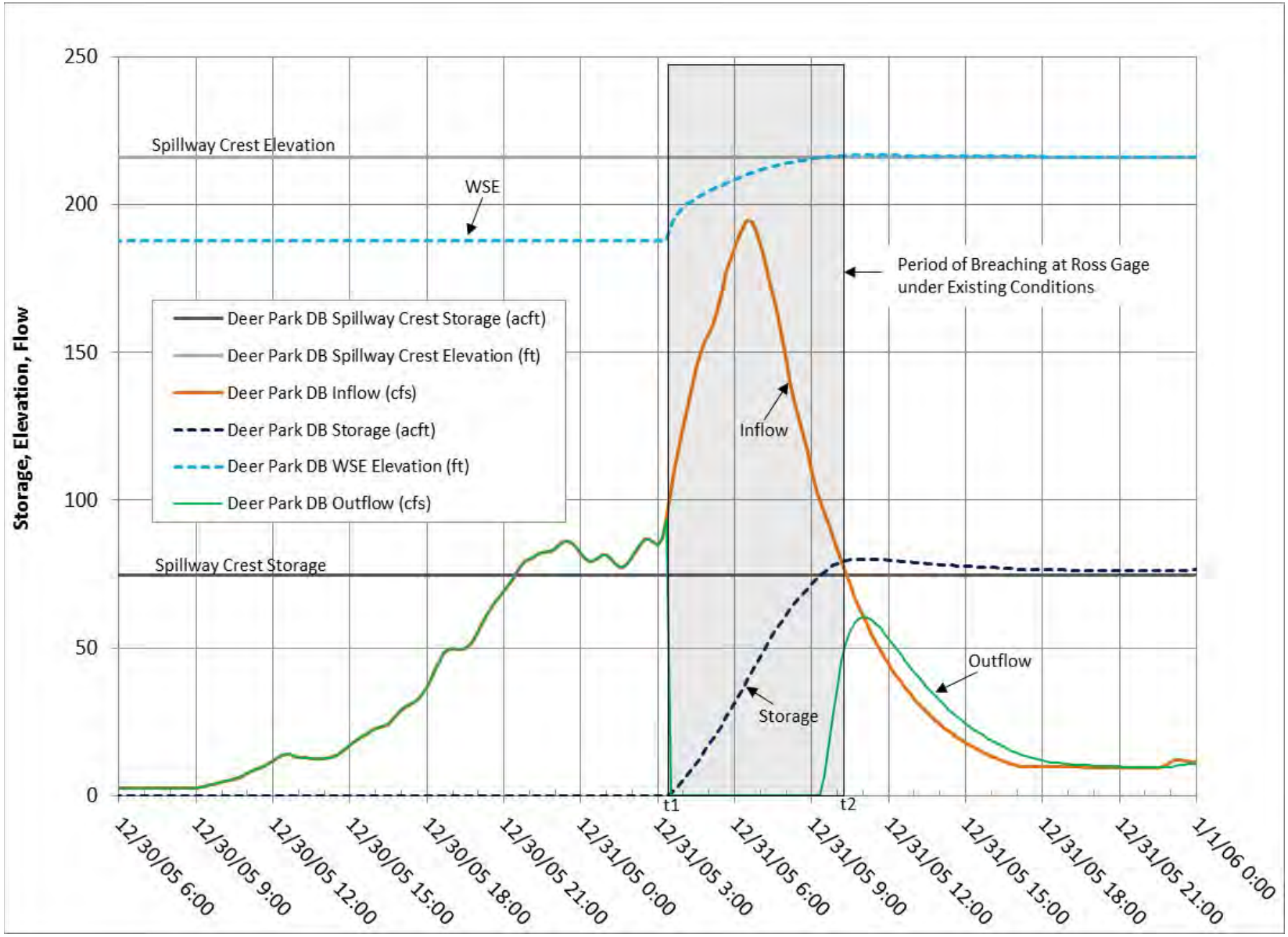

Figure 4 Simulated Hydrographs of San Domenico Detention Basin During the Design Flood Event of 12/31/2005

(The designed low-level outlet closed at the time of incipient flooding (t_1))

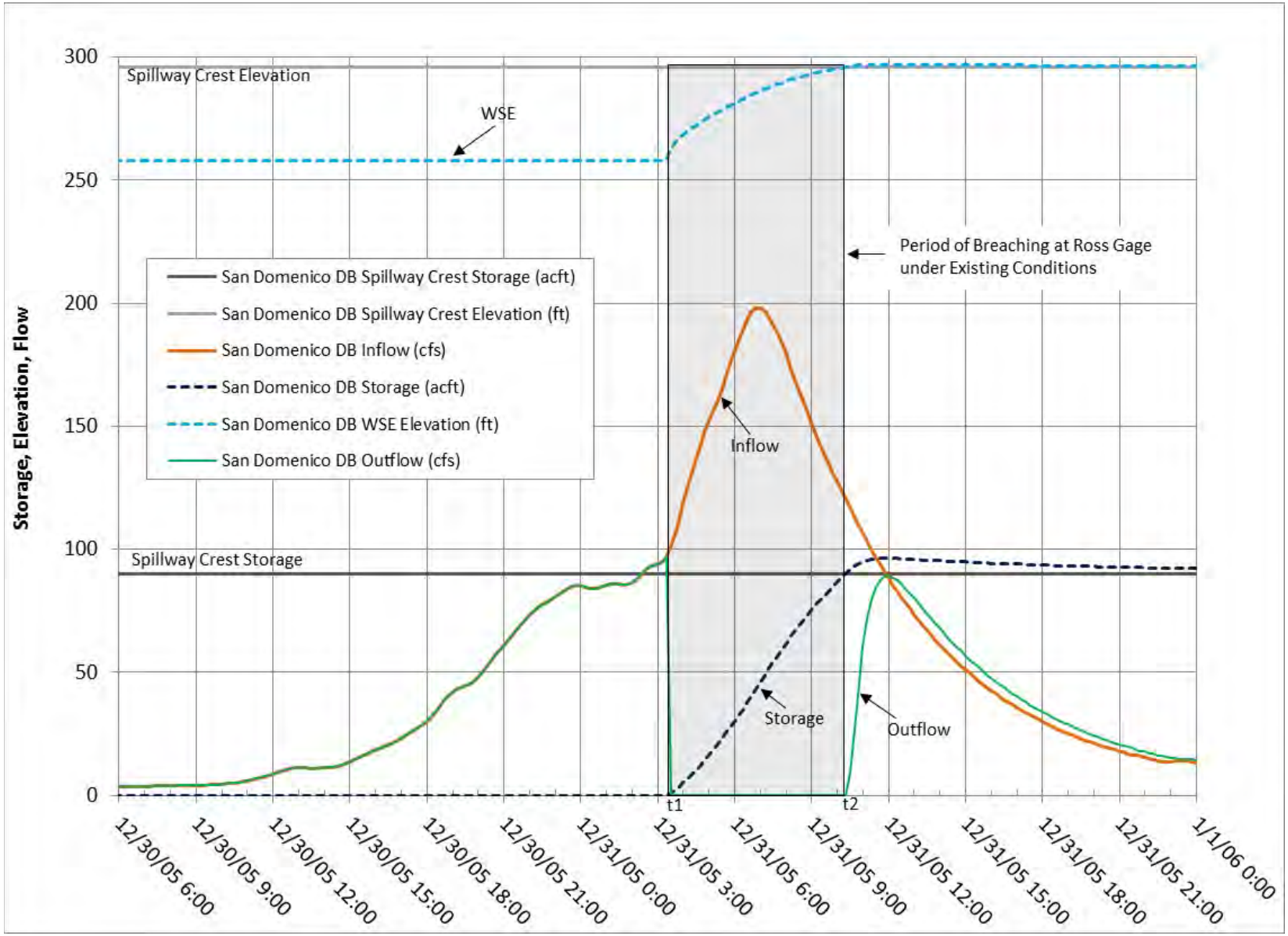

Figure 5 Simulated Hydrographs of Nursery Detention Basin During the Design Flood Event of 12/31/2005 under Alternatives 1 and 2

(The designed smaller culvert open all time and the designed larger culvert closed at t_1)

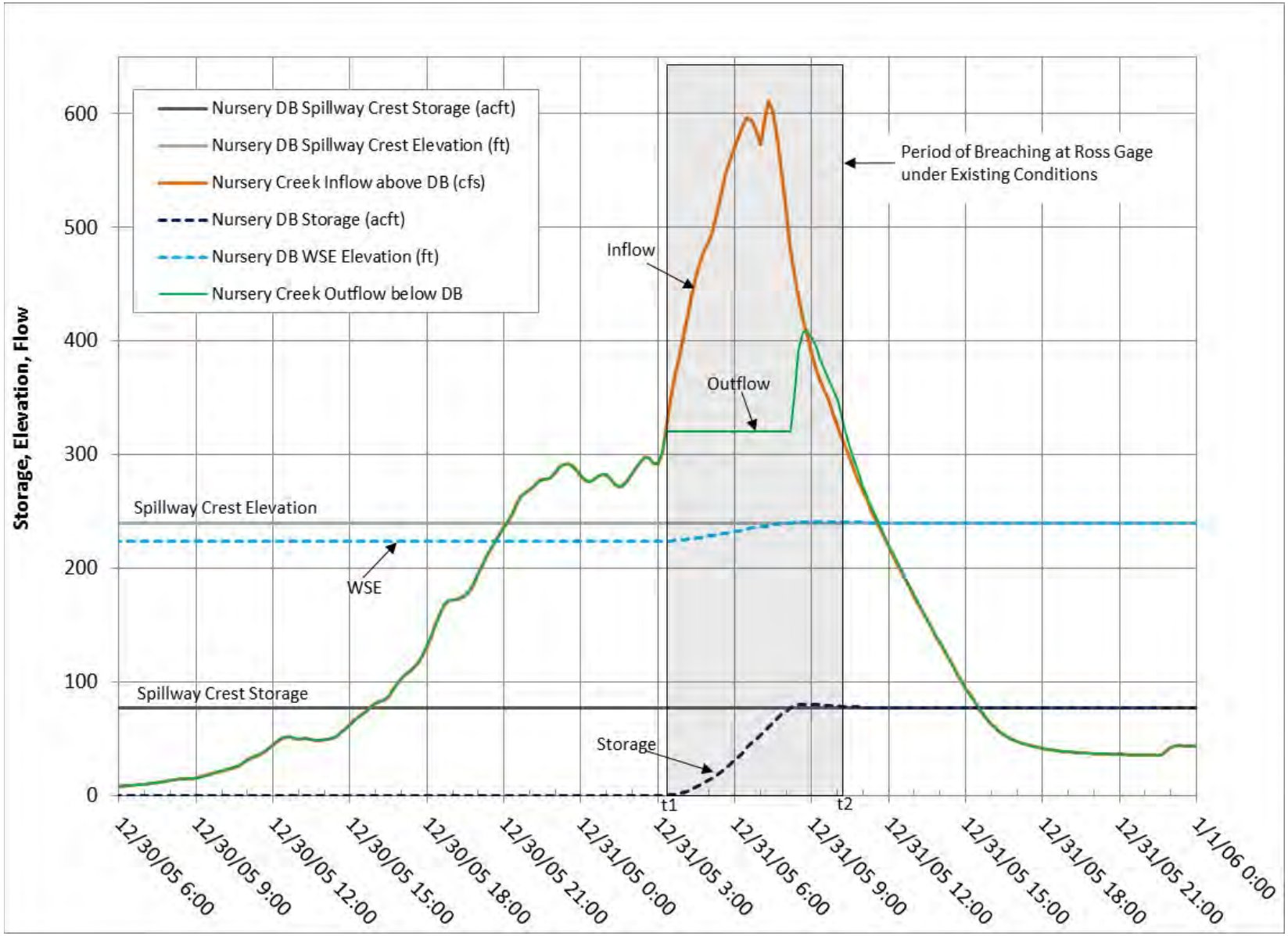

Figure 6 Simulated Hydrographs of Nursery Detention Basin During the Design Flood Event of 12/31/2005 under Alternative 3

(The designed smaller culvert open all time and the designed larger culvert closed at t_1)

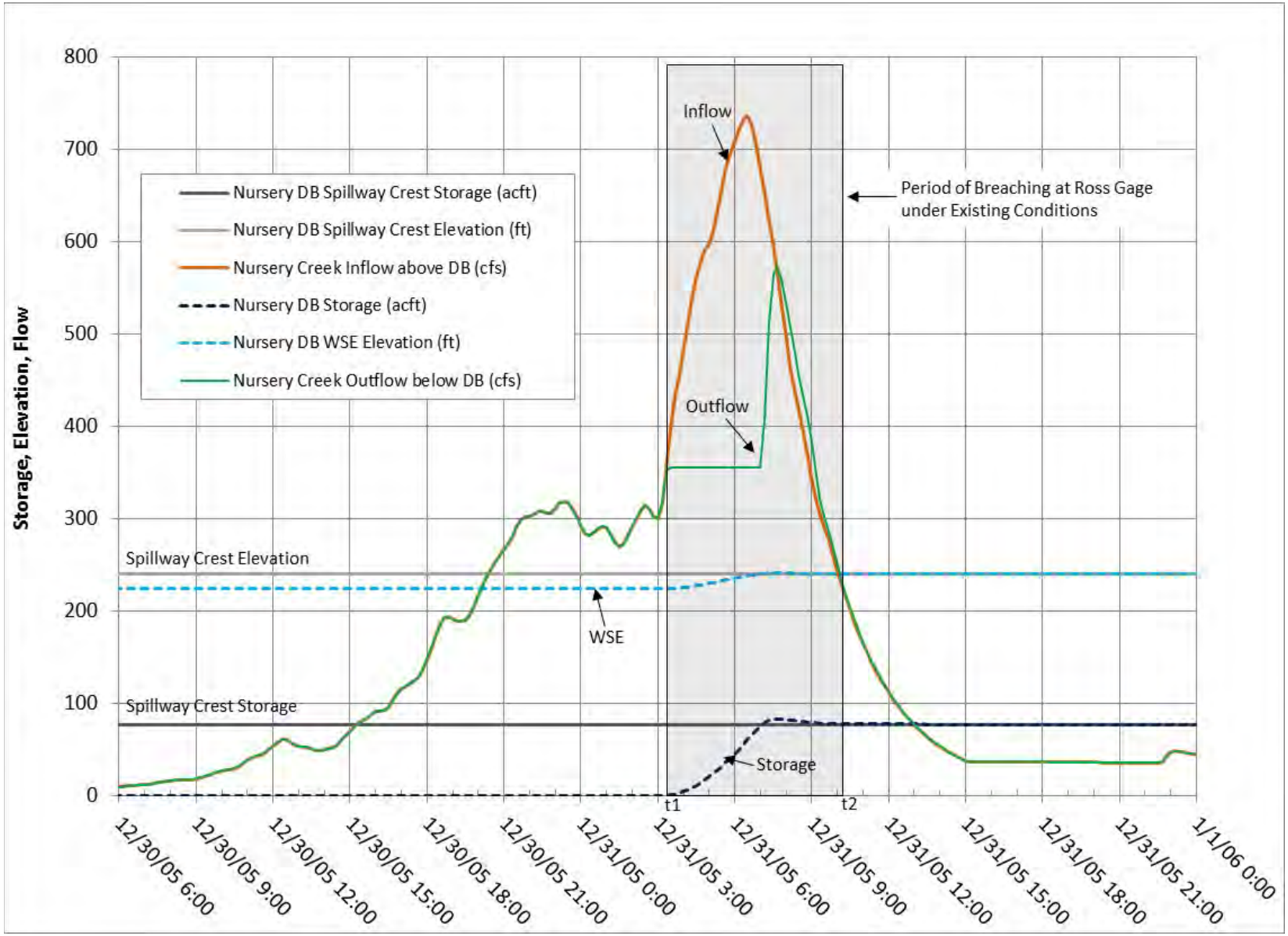

Figure 7 Simulated Hydrographs of Lefty Gomez Detention Basin During the Design Flood Event of 12/31/2005 under Alternative 3

(The designed smaller culvert open all time and the designed larger culvert closed at t_1)

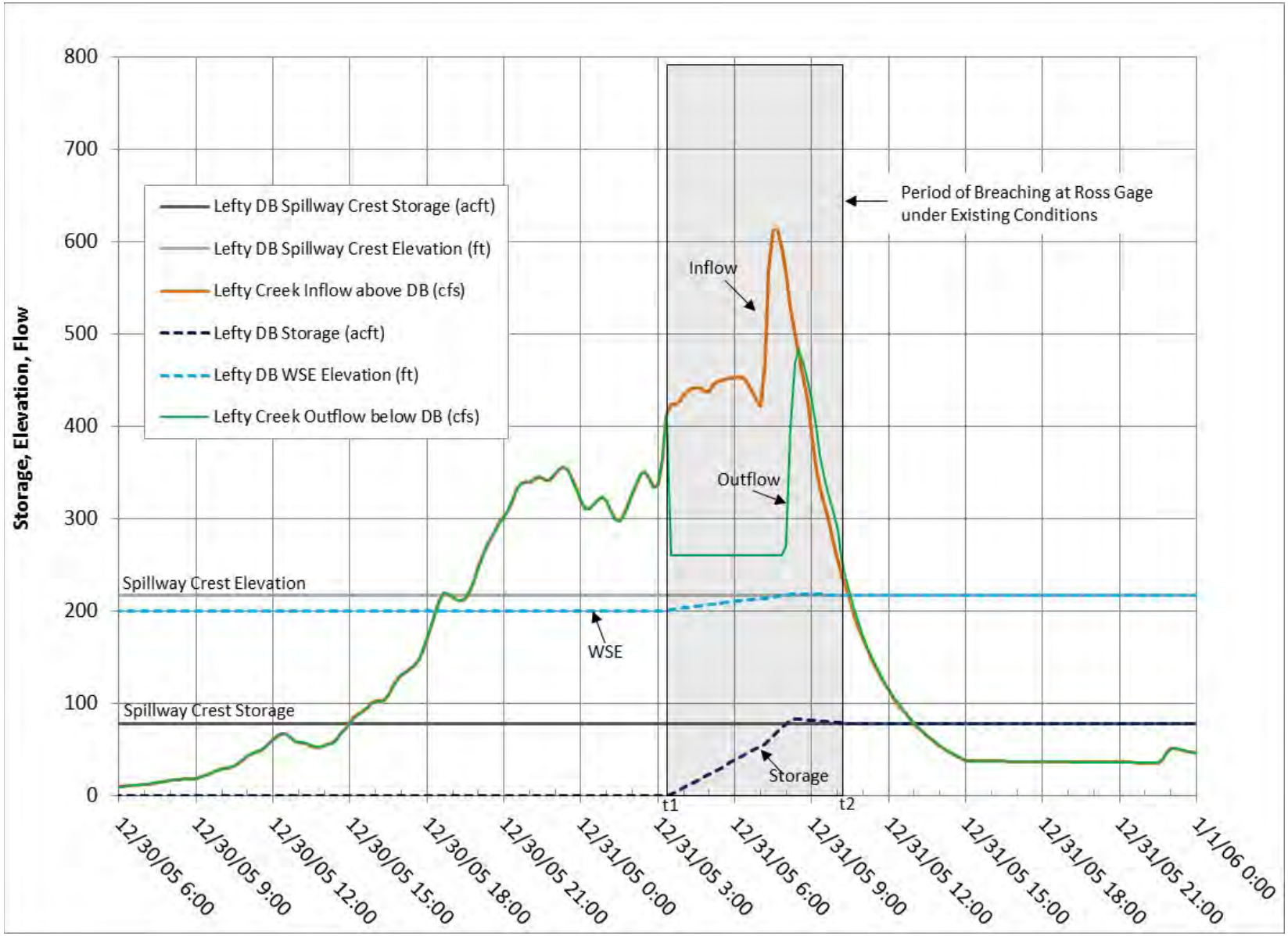

Figure 8 Peak Flow Reduction at Downstream End of Fairfax Creek - Alternative 1

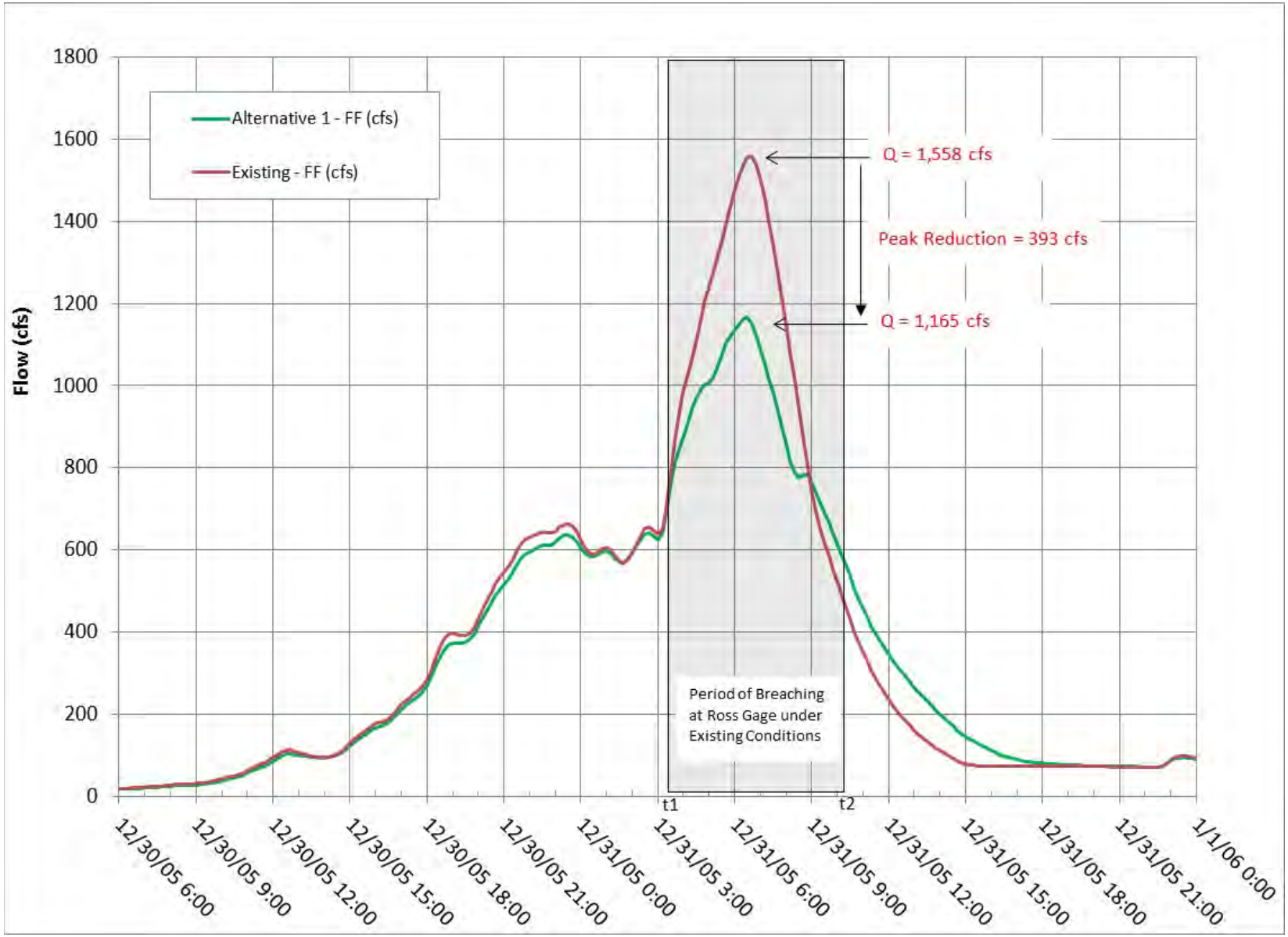

Figure 9 Peak Flow Reduction at San Anselmo Creek below Sorich Creek Confluence - Alternative 1

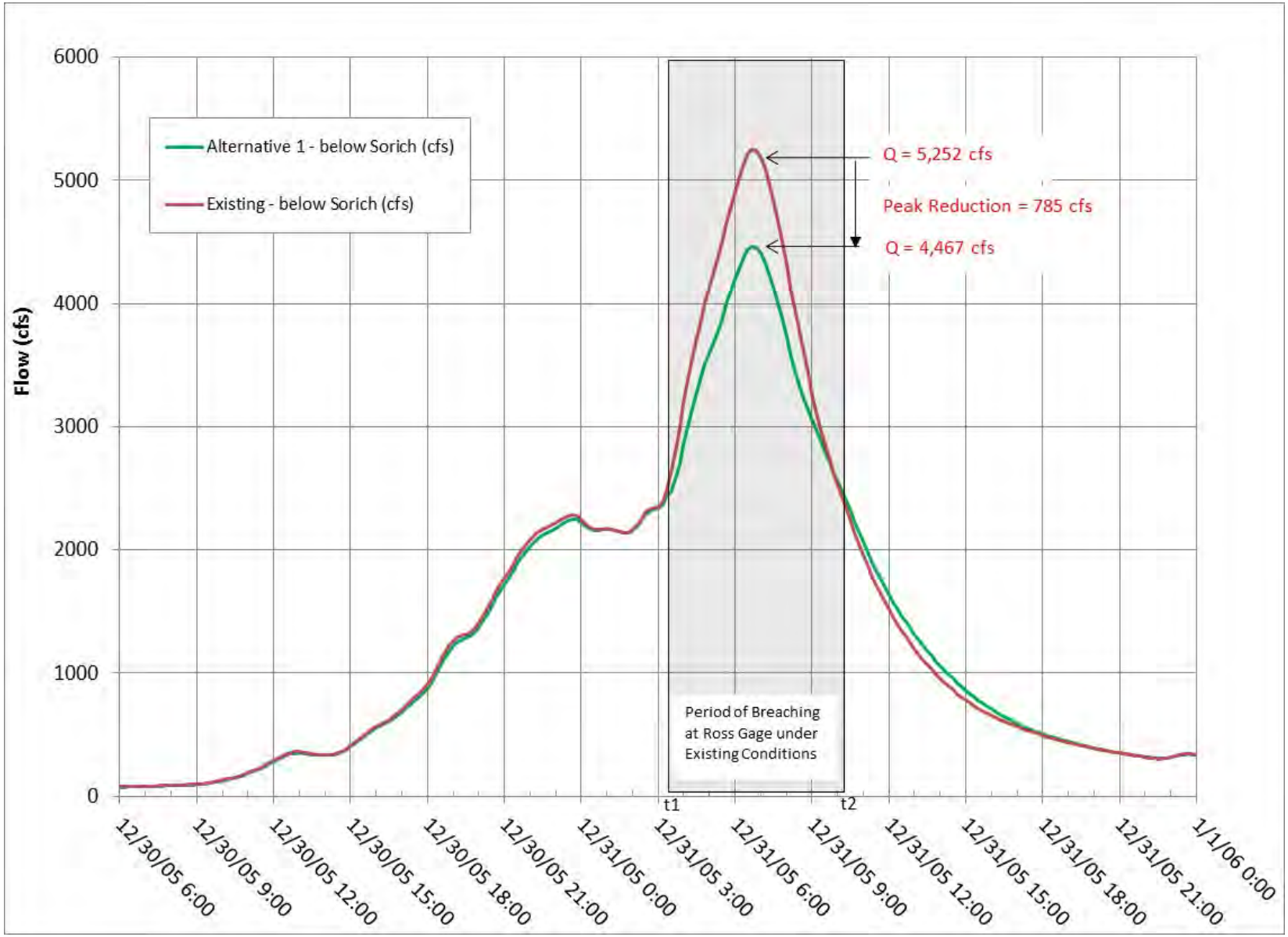

Figure 10 Peak Flow Reduction at Ross Gage - Alternative 1

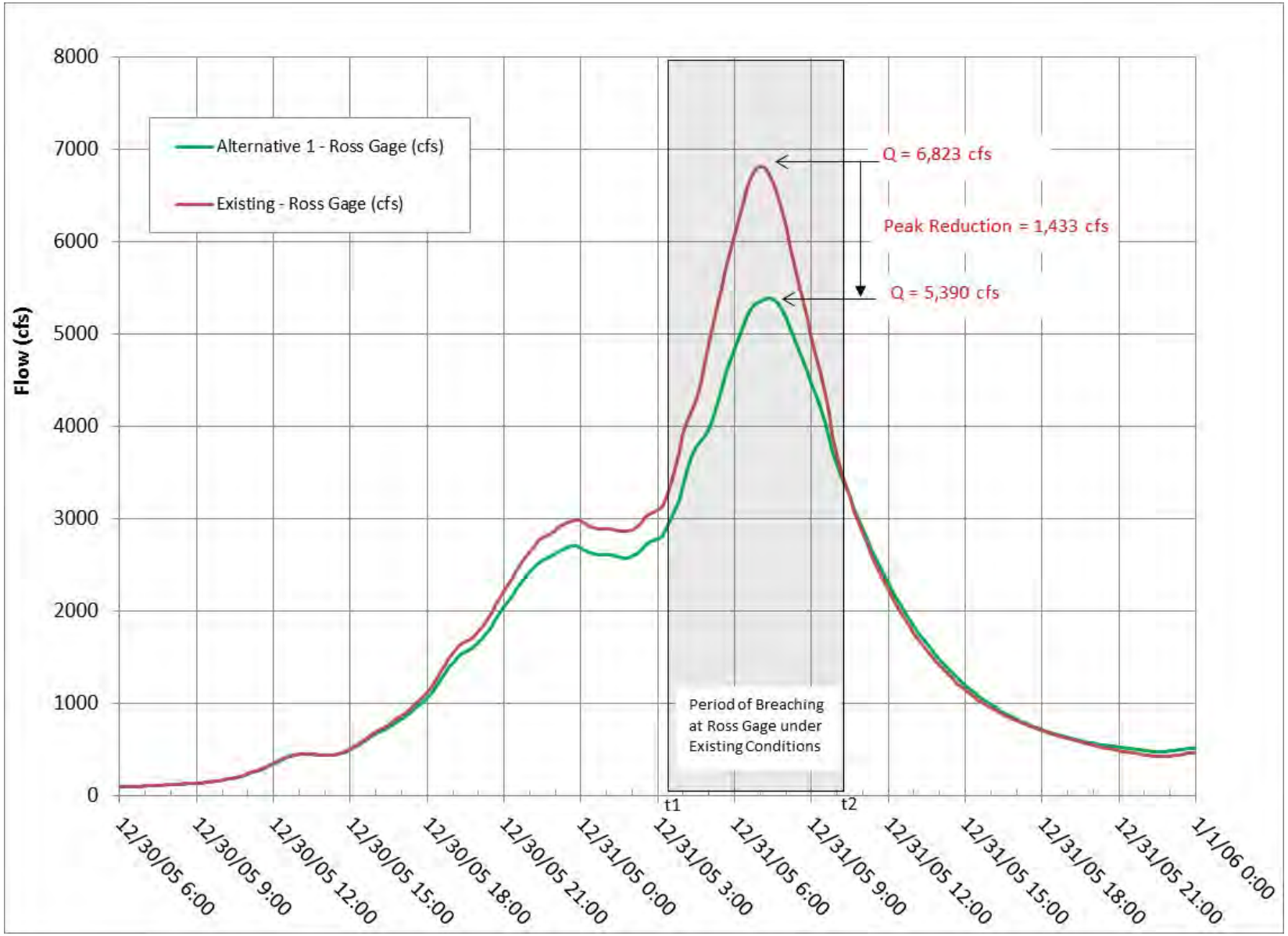

Figure 11 Peak Flow Reduction at Downstream End of Fairfax Creek - Alternative 2

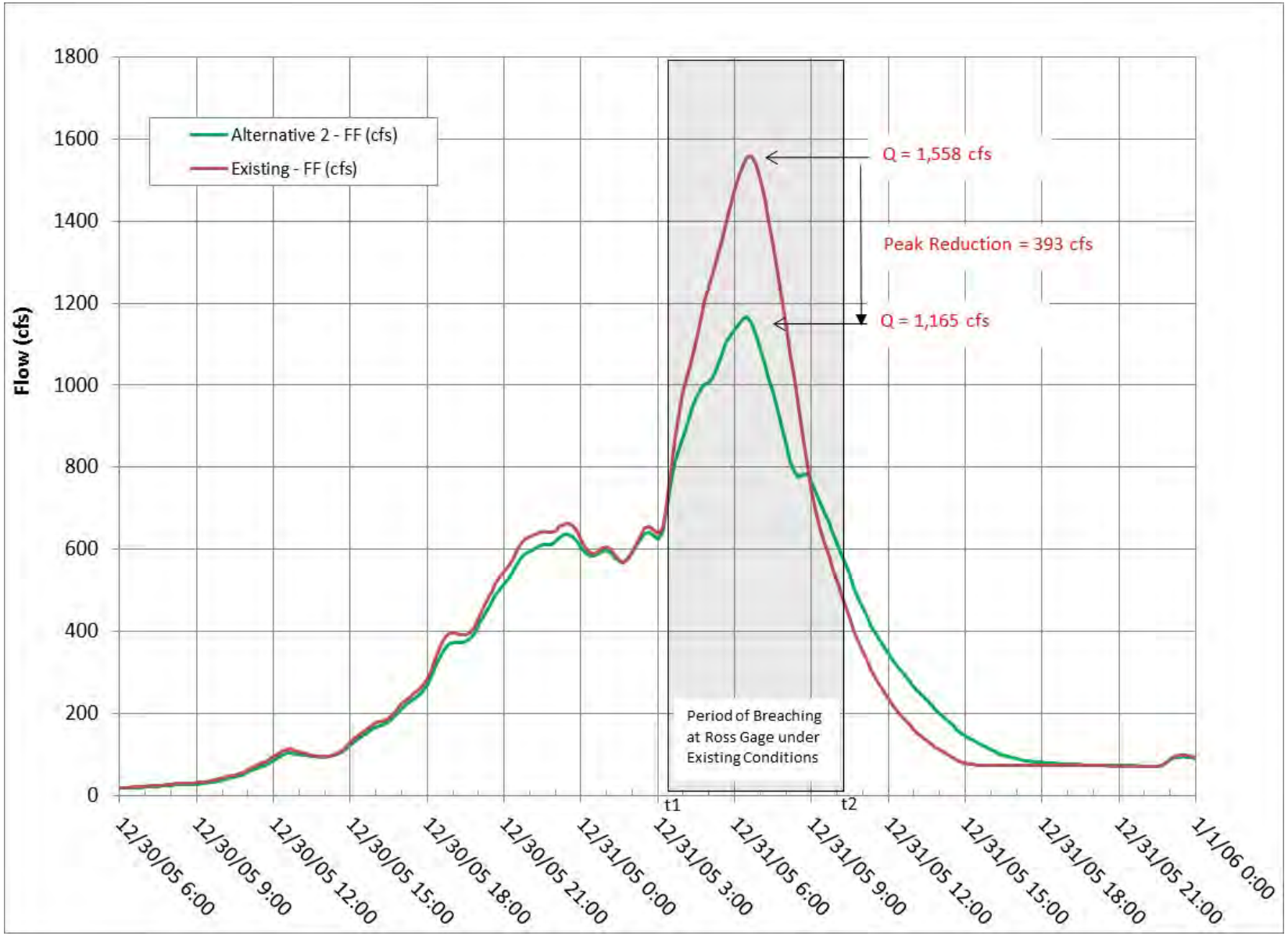

Figure 12 Peak Flow Reduction at San Anselmo Creek below Sorich Creek Confluence - Alternative 2

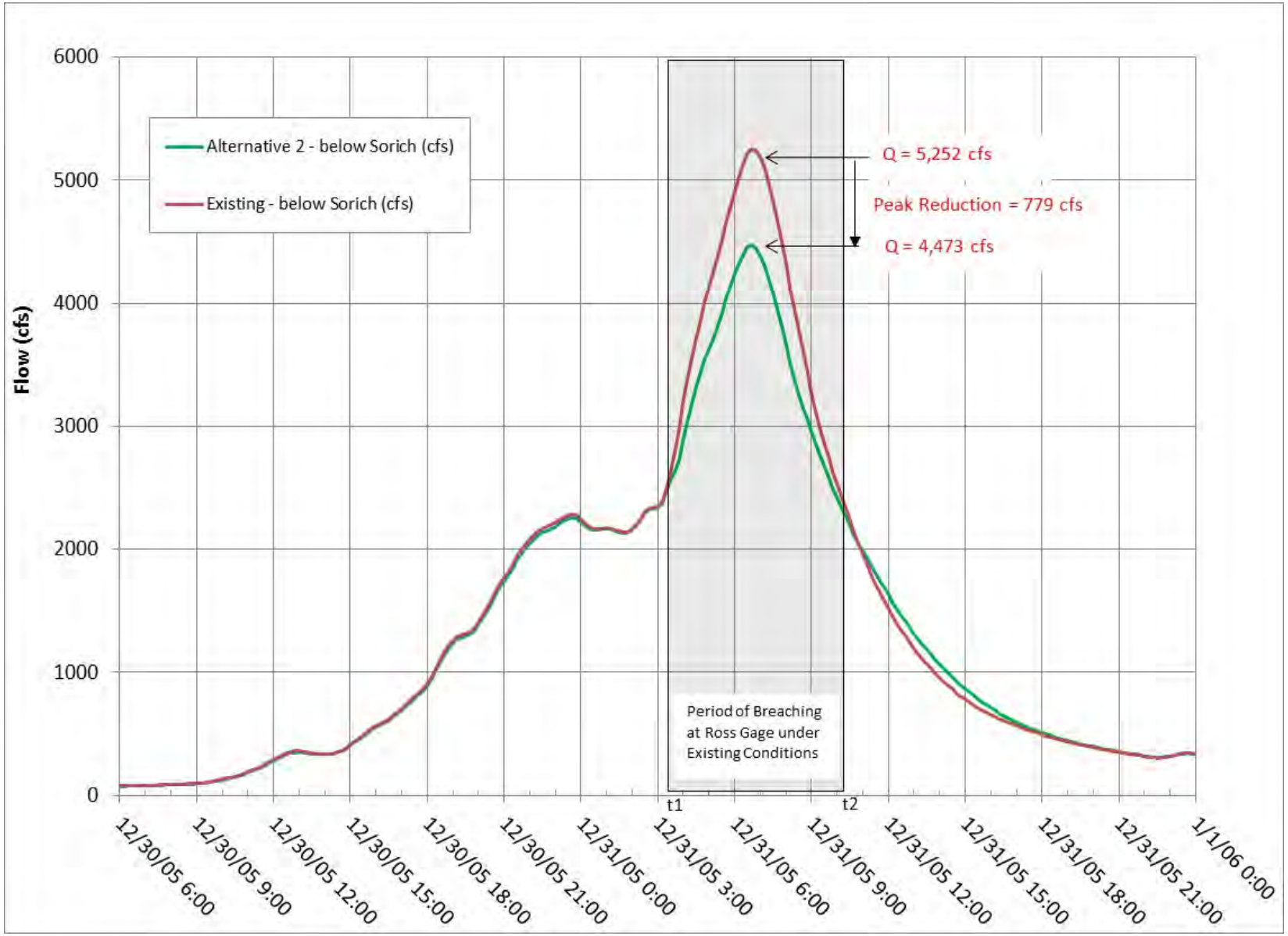

Figure 13 Peak Flow Reduction at Ross Gage - Alternative 2

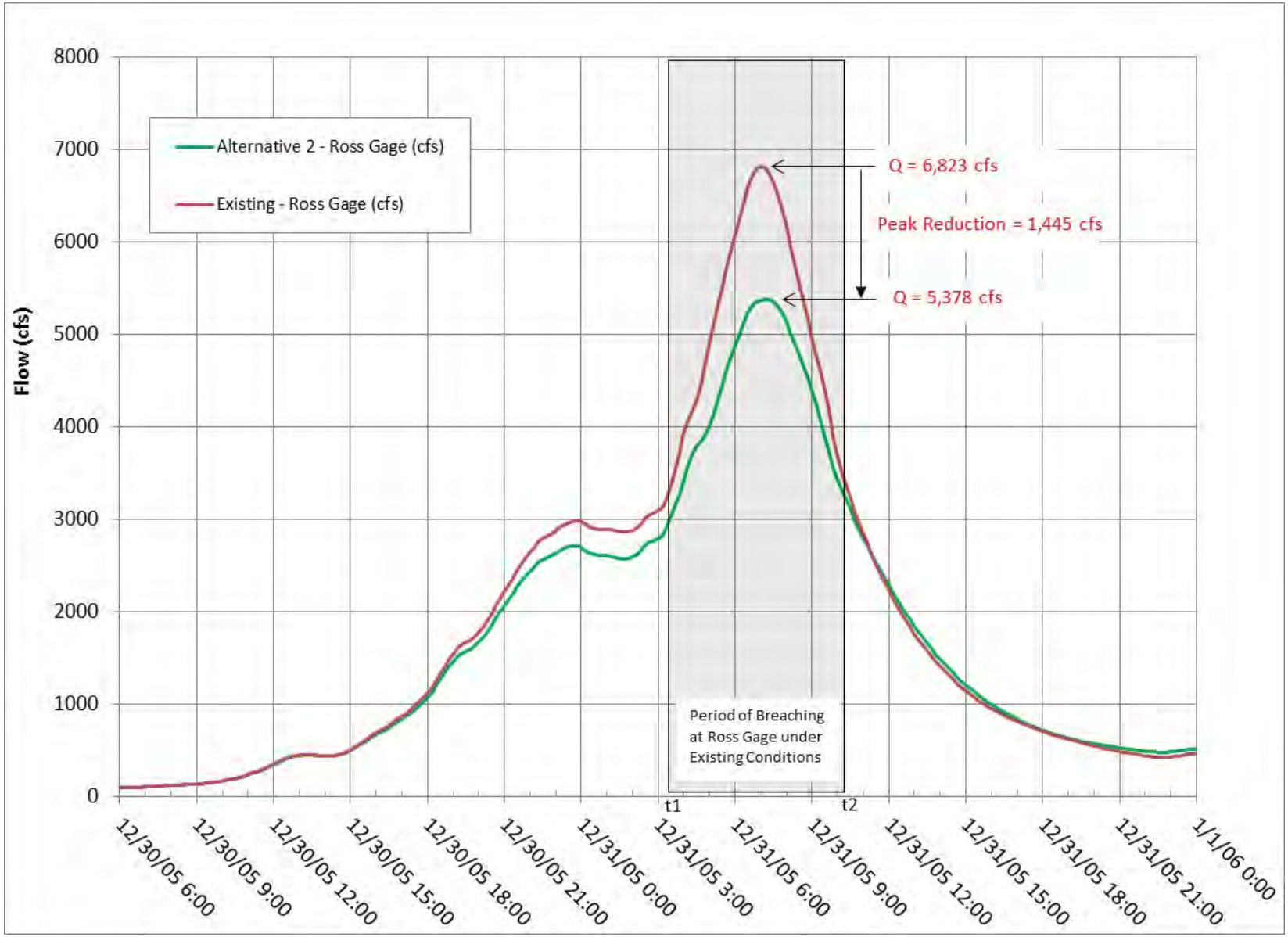

Figure 14 Peak Flow Reduction at Downstream End of Fairfax Creek - Alternative 3

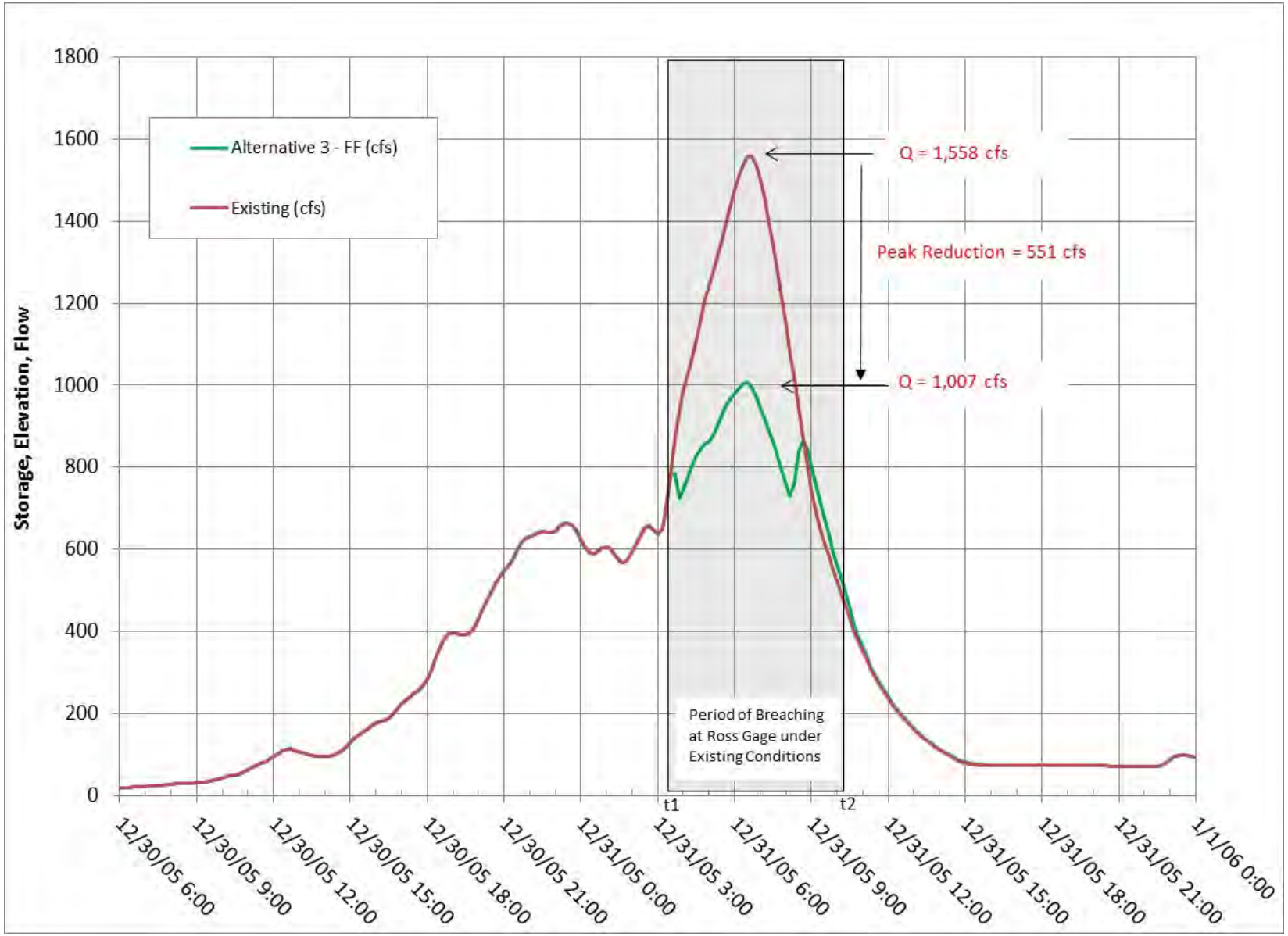

Figure 15 Peak Flow Reduction at San Anselmo Creek below Sorich Creek Confluence - Alternative 3

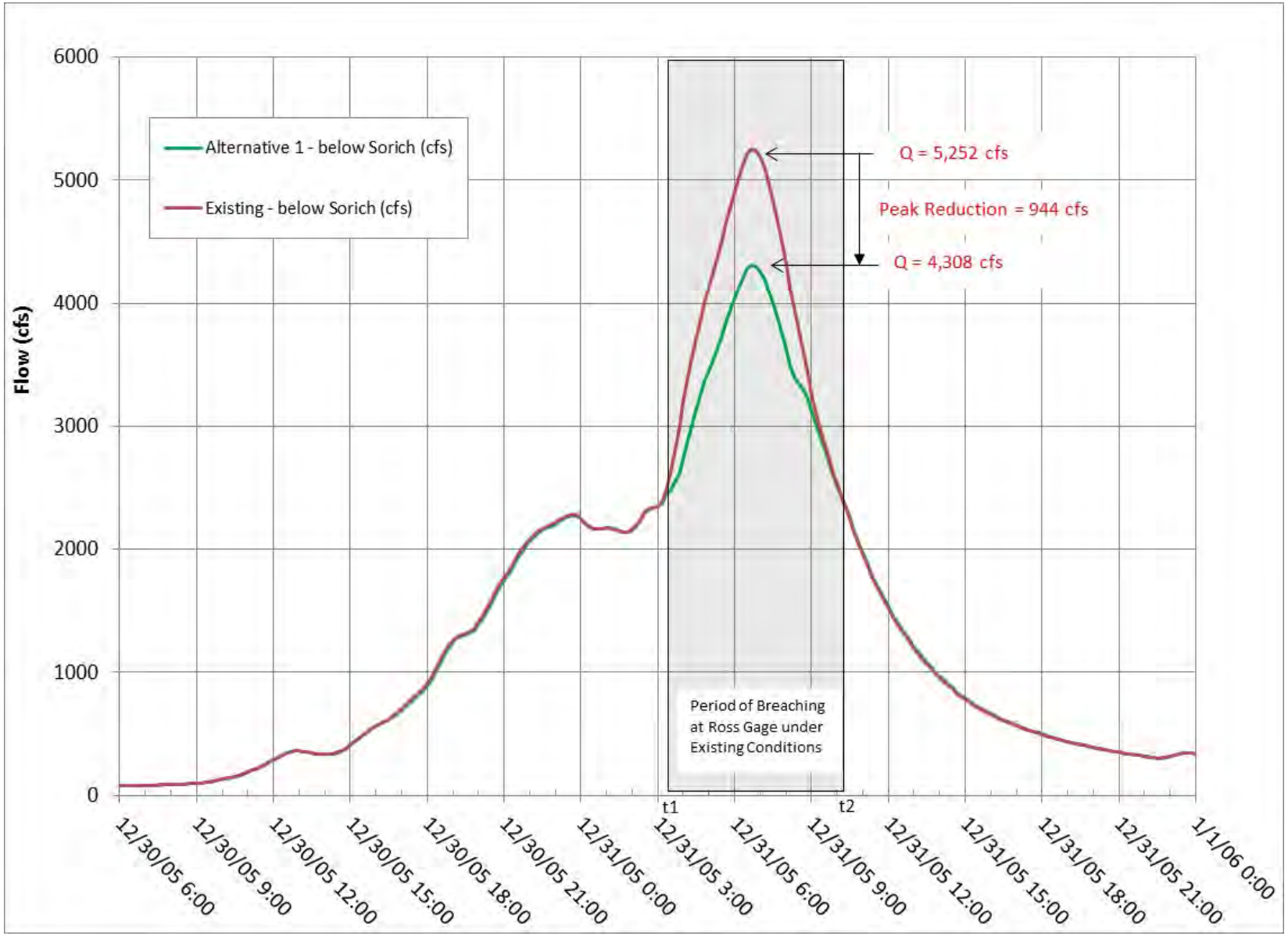

Figure 16 Peak Flow Reduction at Ross Gage - Alternative 3