

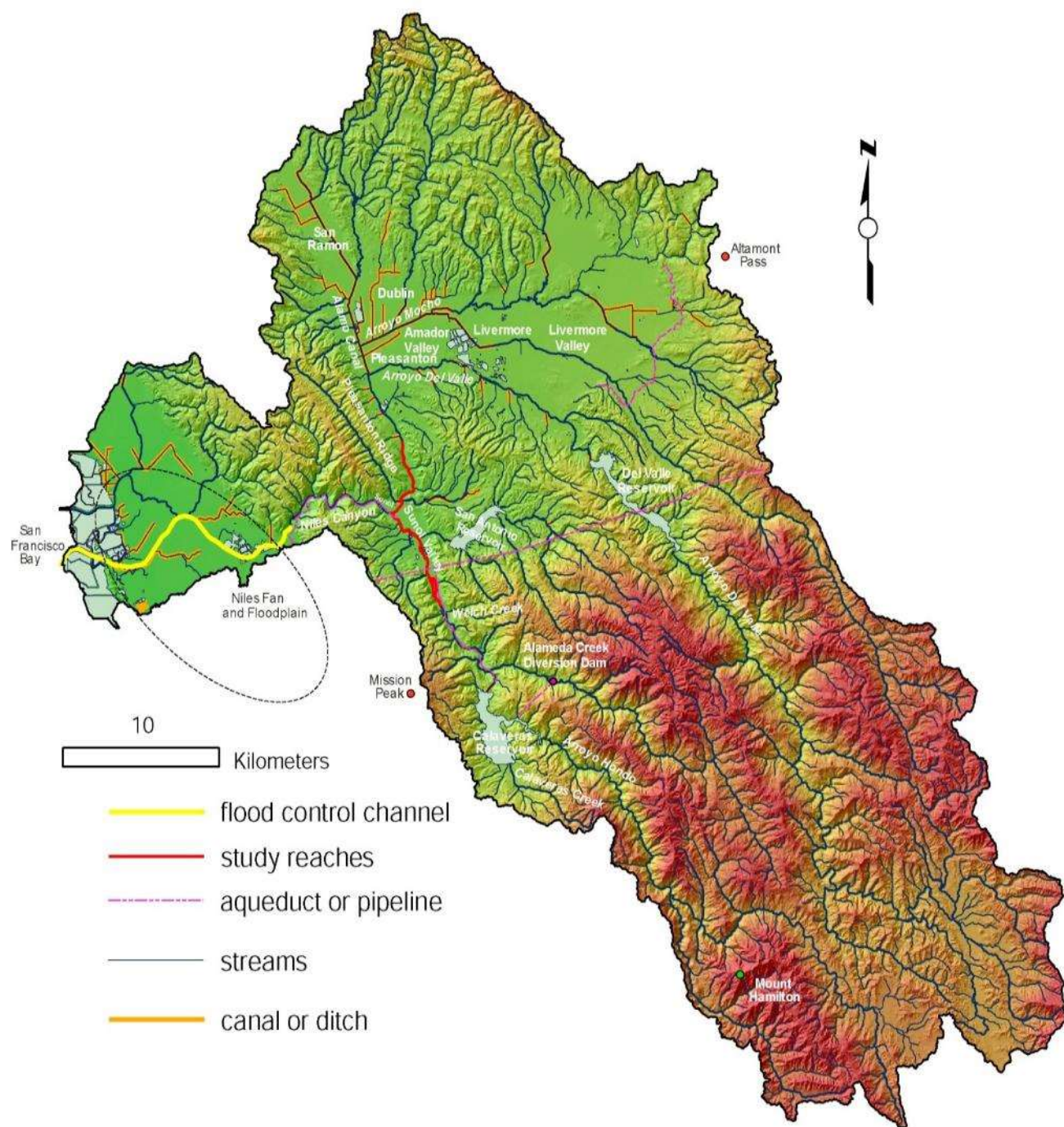


Alameda Creek Sediment Transport and Fish Passages Optimization Study

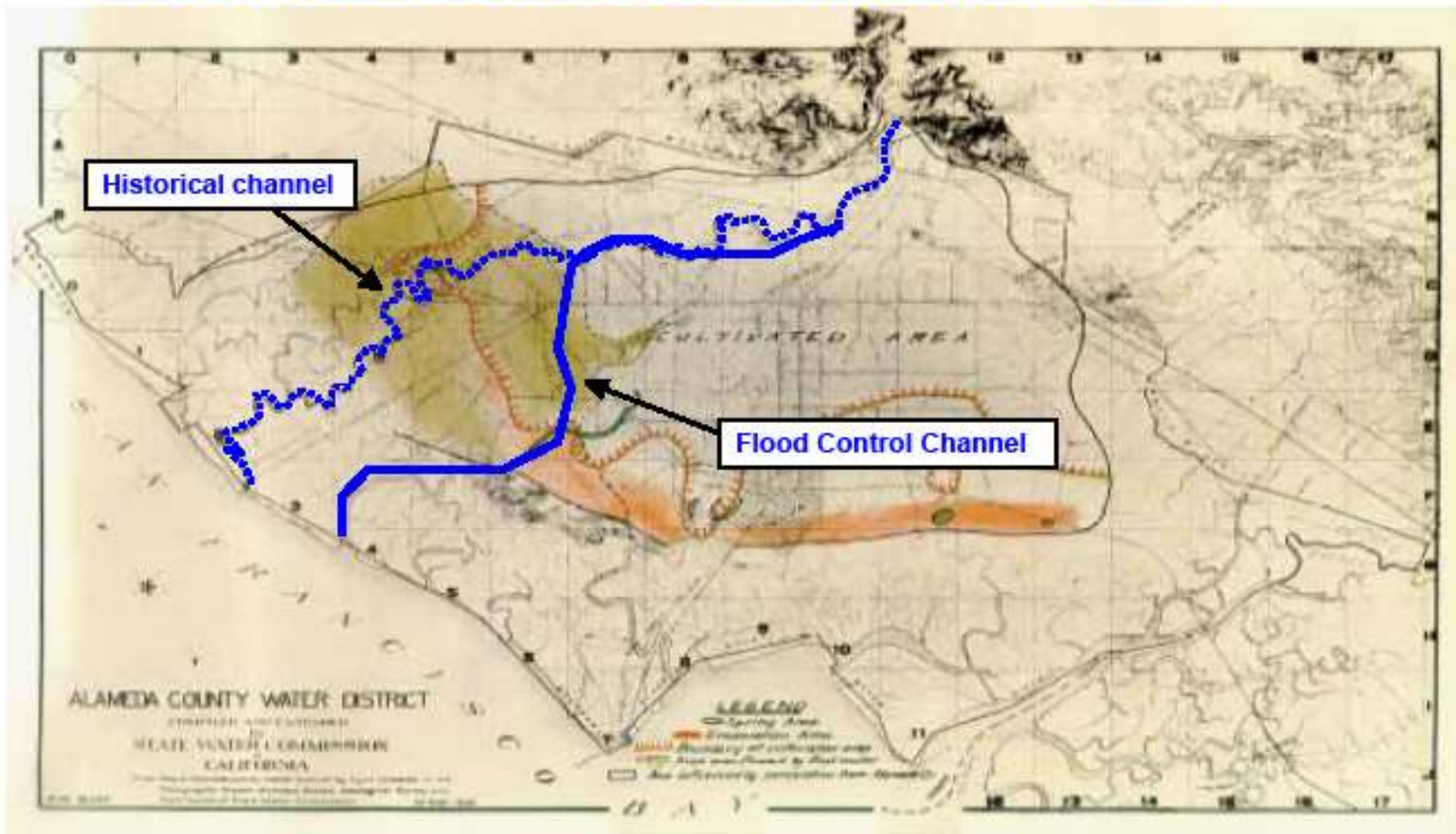
Focus on Sustainability

*By Rohin Saleh P.E.
Alameda County Flood Control and Water Conservation District*

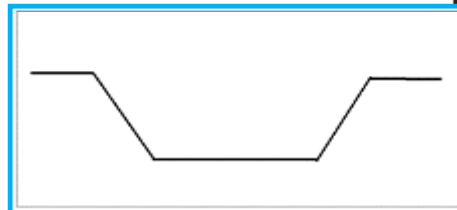
Alameda Creek Watershed



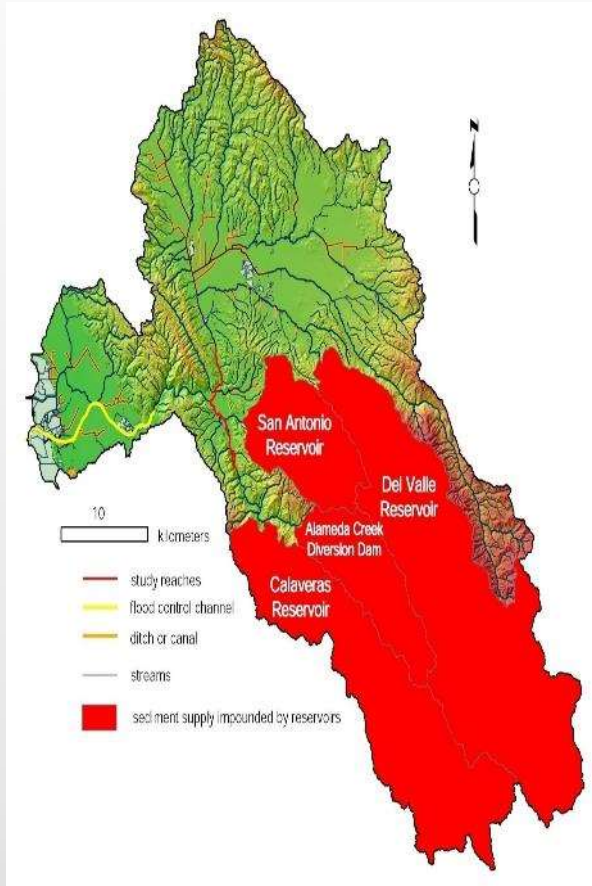
Lower Alameda Creek...then and now



Channelization of the Lower Creek



Alameda Creek Design Discharges



- ▶ Federal Project consists of a trapezoidal earth channel and levees.
- ▶ Designed to contain Standard Project Flood of 52,000 cfs.
- ▶ Provides protection for a 100 year event of 31,000 cfs with free board.

| Gage Location | Drainage Area | Drainage Area | % Area |
|------------------------------------|-------------------------------|--------------------------|------------|
| | Below Dams (km ²) | total (km ²) | Above Dams |
| Arroyo de La Laguna at Verona Gage | 670 | 1044 | 36% |
| Alameda Creek near Welch Ck Gage | 35 | 376 | 91% |
| Alameda Creek at Niles Gage | 821 | 1639 | 50% |

Sediment Load at Niles Gage

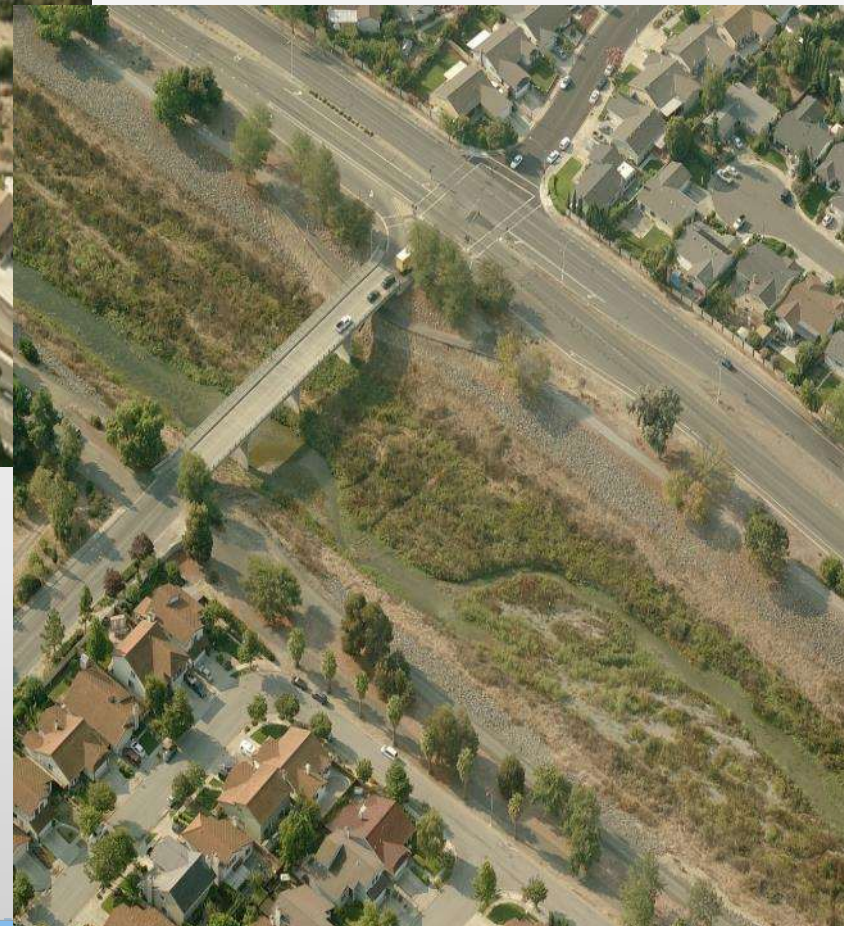
| Time Period | Niles Ton/yr |
|-------------------------|-------------------------|
| 1959 to 1971 | 74,000 |
| 1972 to 1993 | 90,000 |
| 1994 to 2006 | 156,000 |



Natural formation of low flow channels and flood terraces as a result of morphologic processes

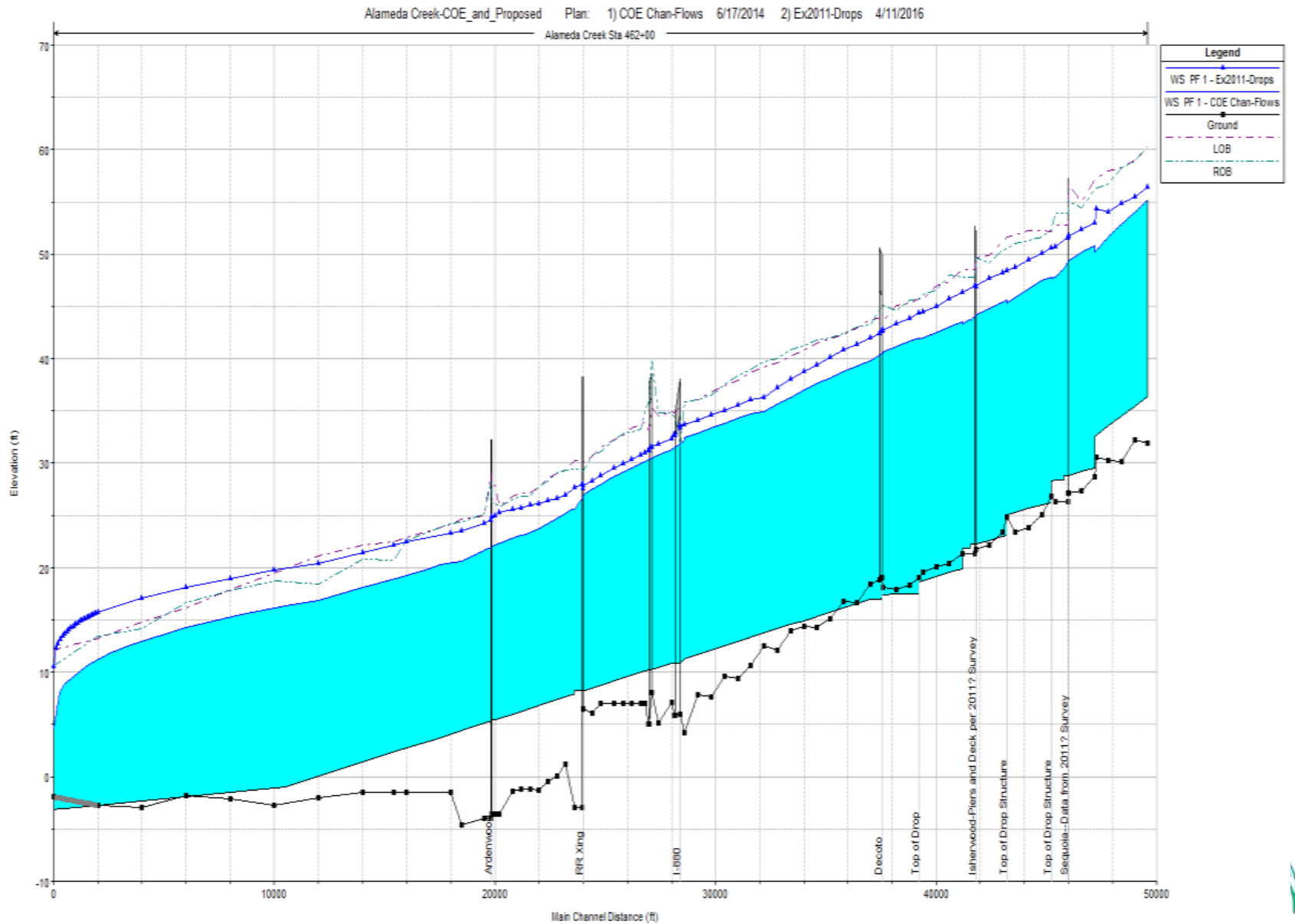


Fluvial Reach



Tidal Reach

Existing Thalweg and CORPS Design Geometry– Bay to BART Weir



Isherwood Way to Sill 412+00

Station 436+00 to 412+00

This reach encompasses a Sill at 432+00. Minor switching between braided channels occurs for roughly 500 feet downstream of Sill 432+00. From there, the low-flow planform has been stable since 2002, flowing to the south side of the channel before returning to center at Sill 412+00.



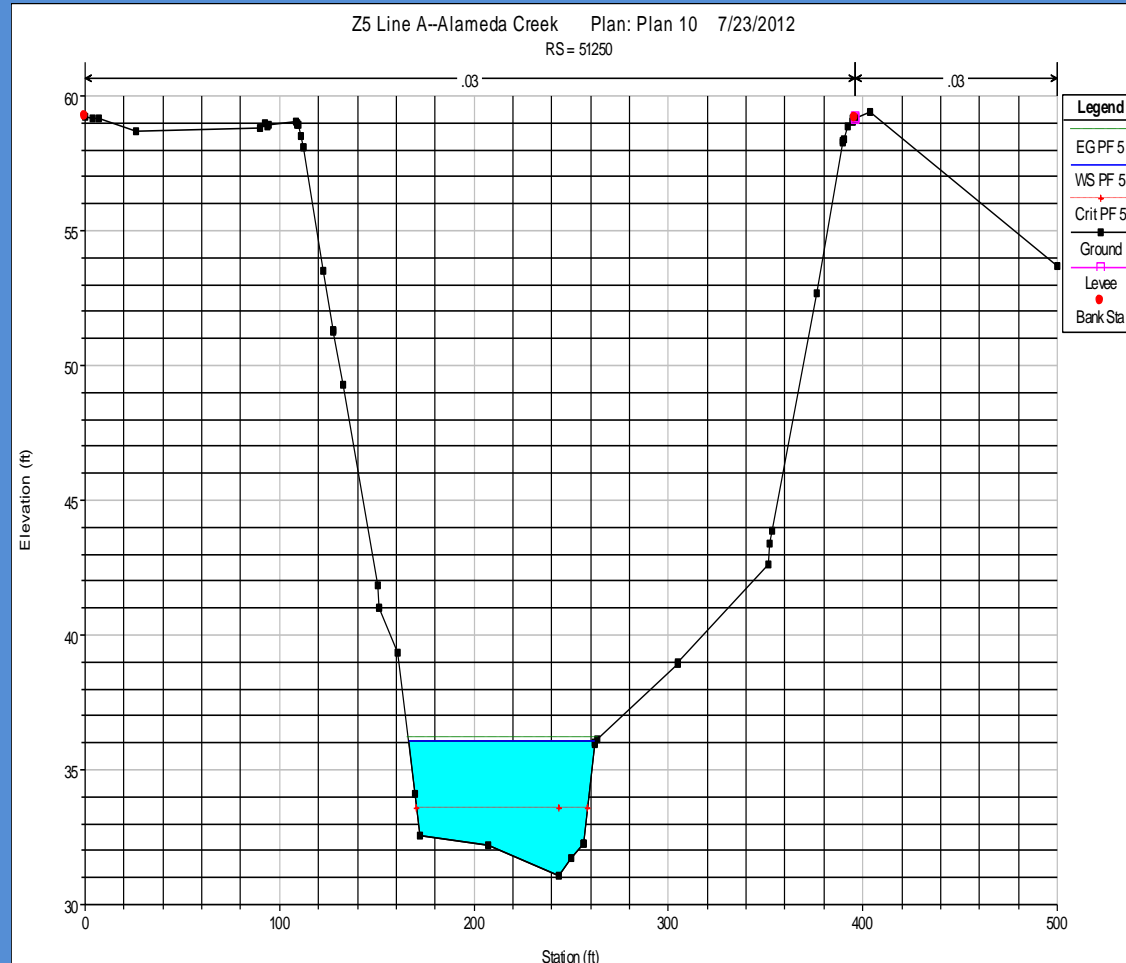
Sill 412+00 to Decoto Road

Station 412+00 to 395+00

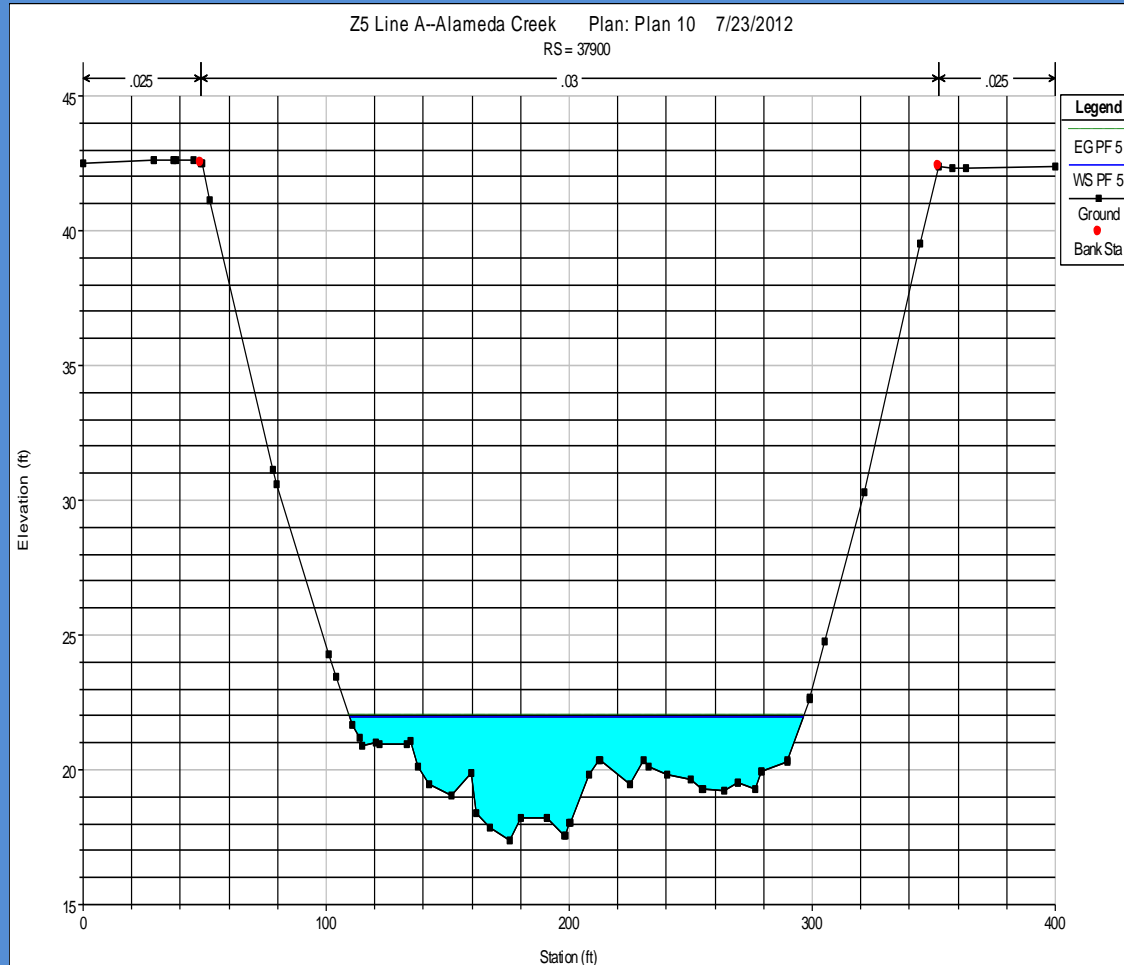
As in previous reaches, deposition below the sill produces minor switching in low-flow channel planform for approximately 700 feet downstream of the sill. Then, since at least 2002, the low-flow channel runs along the south side of the flood control channel to Decoto Road.



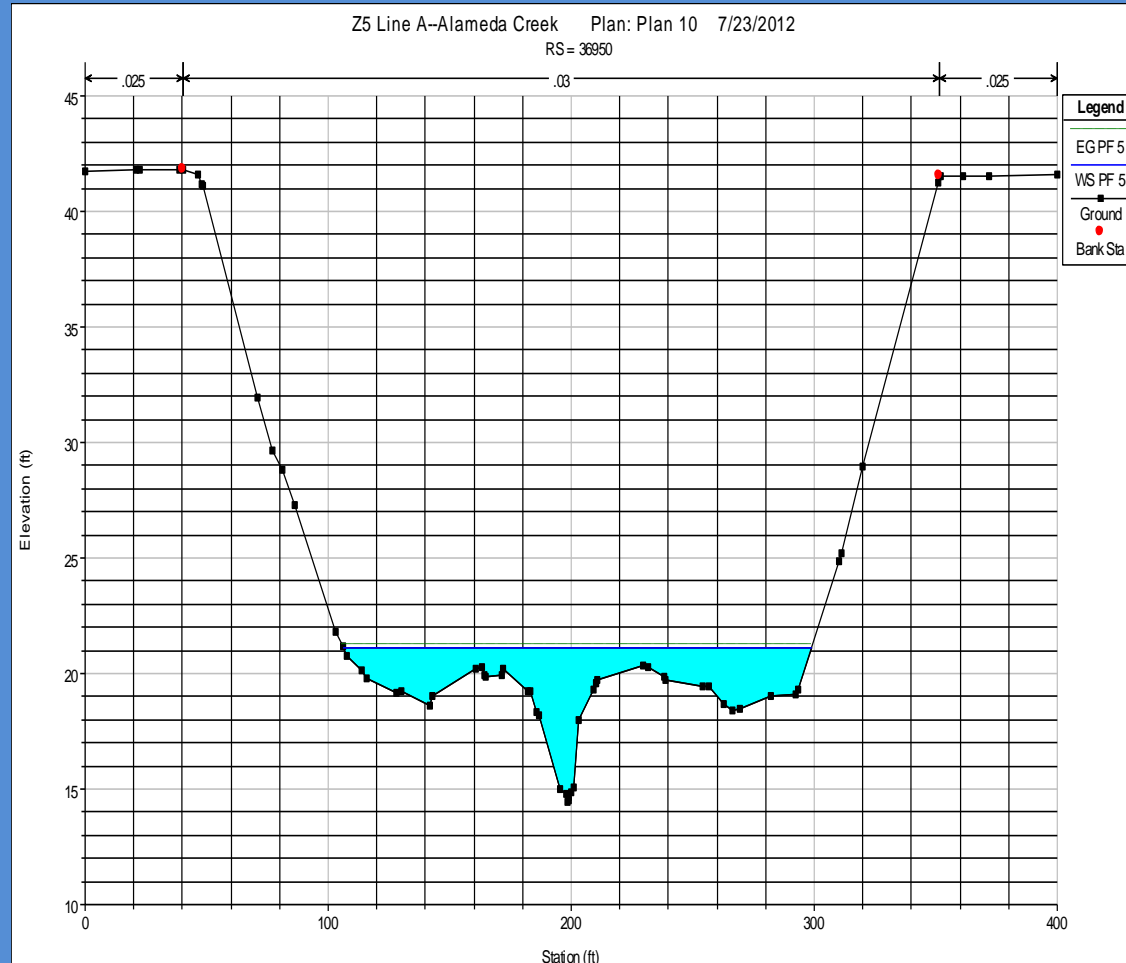
Section 2 – 1000 CFS



Section 9 – 1000 CFS



Section 10 – 1000 CFS



Alameda Creek Niles Canyon Study

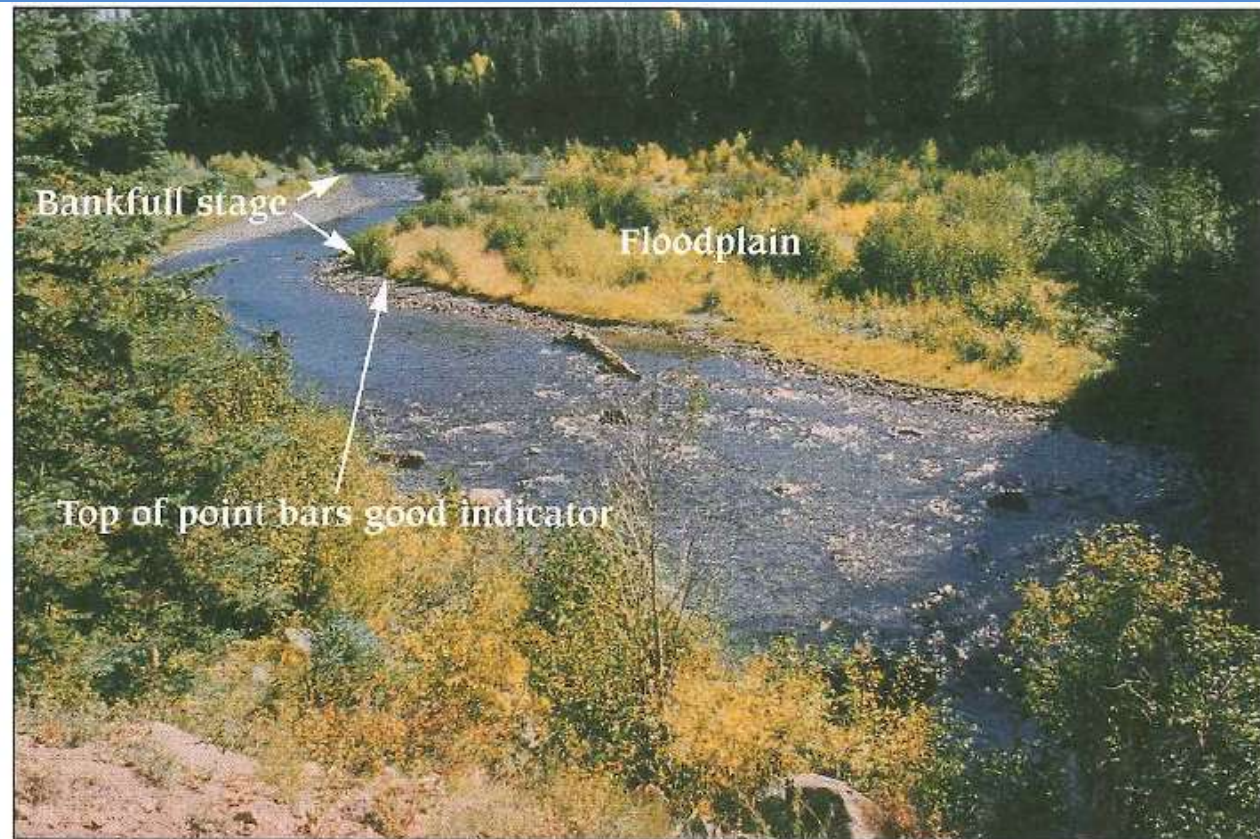
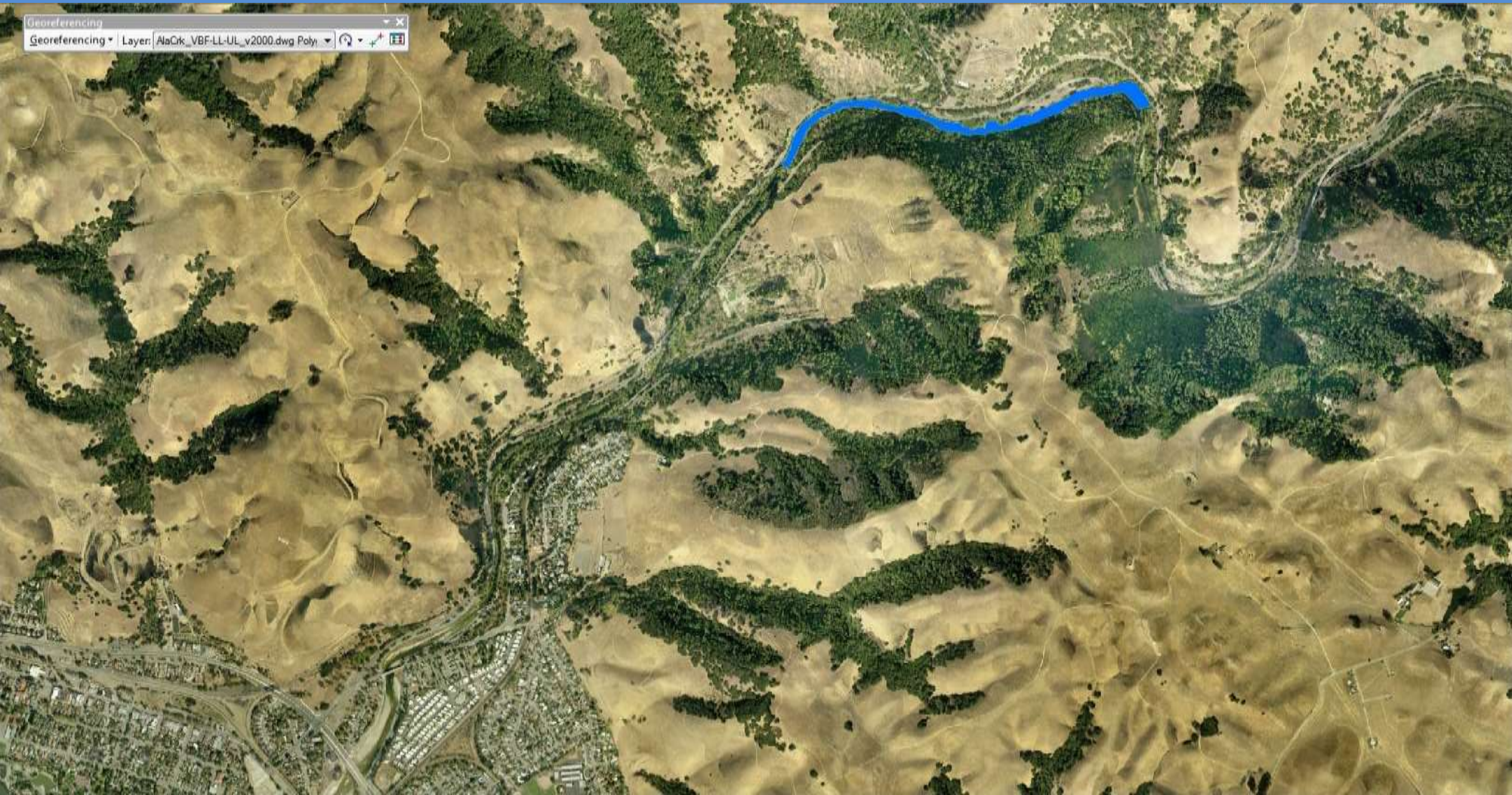


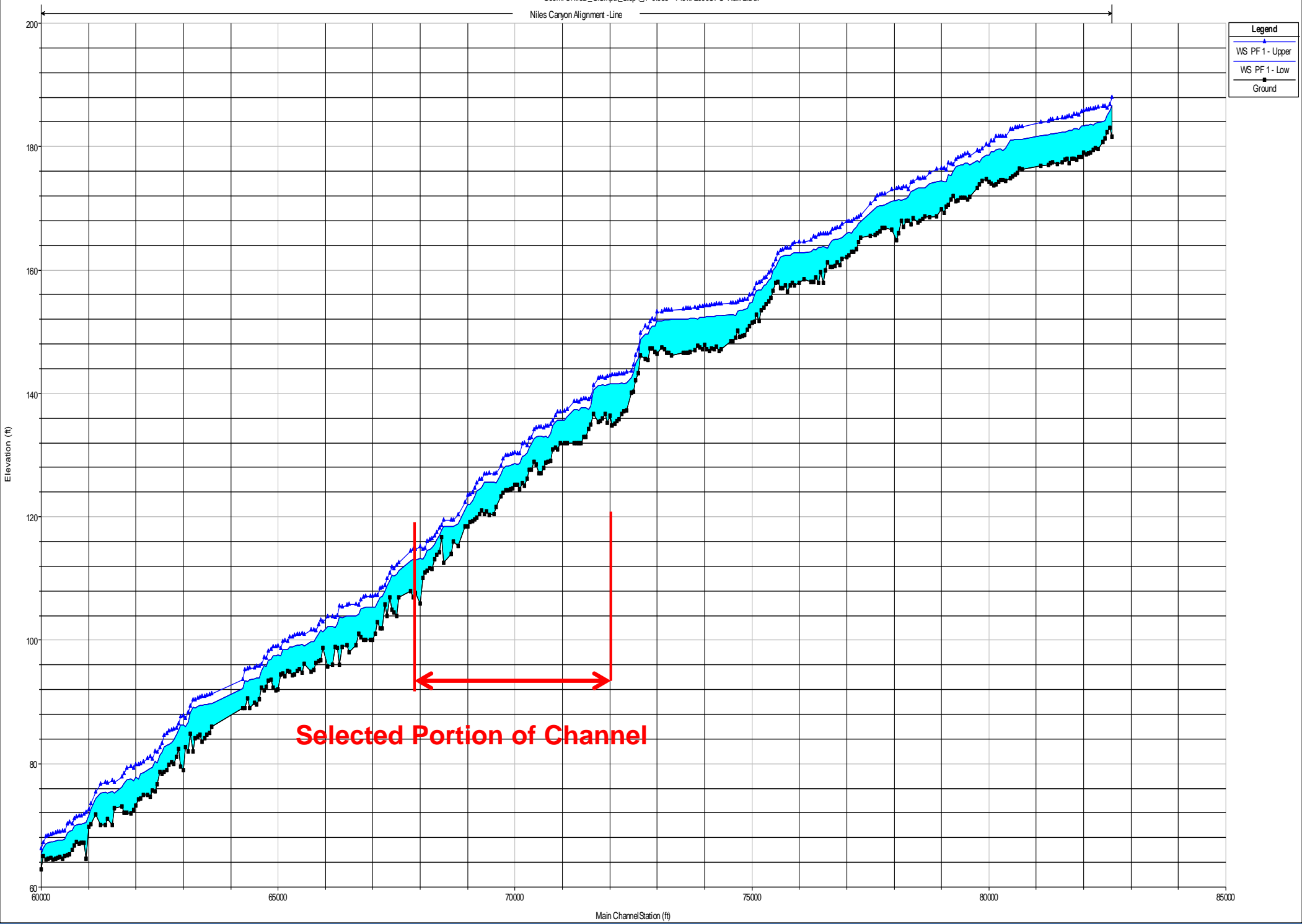
FIGURE 5-6b. East Fork River, Colorado - @ gaging station
Entr. ratio: 6.0, W_{bkf} : 50', d_{bkf} : 2.5', W/D : 20. Channel materials: D-15, 12_{mm},
D-34, 28_{mm}, D-50, 58_{mm}, D-84, 120_{mm}. Stream Type C4.

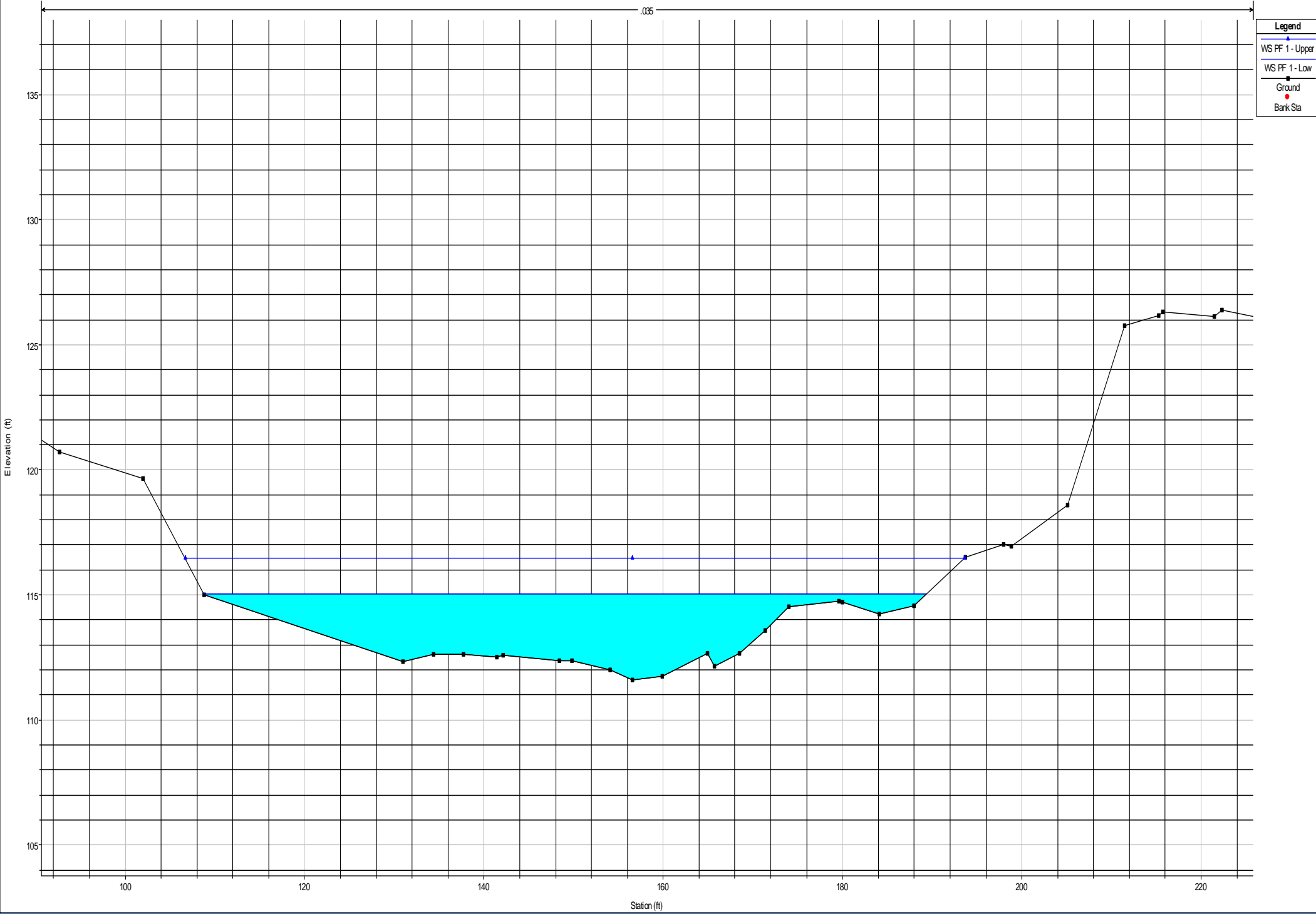
Georeferencing
Georeferencing Layer: AlaCik_VBF-LL-UL_v2000.dwg Poly

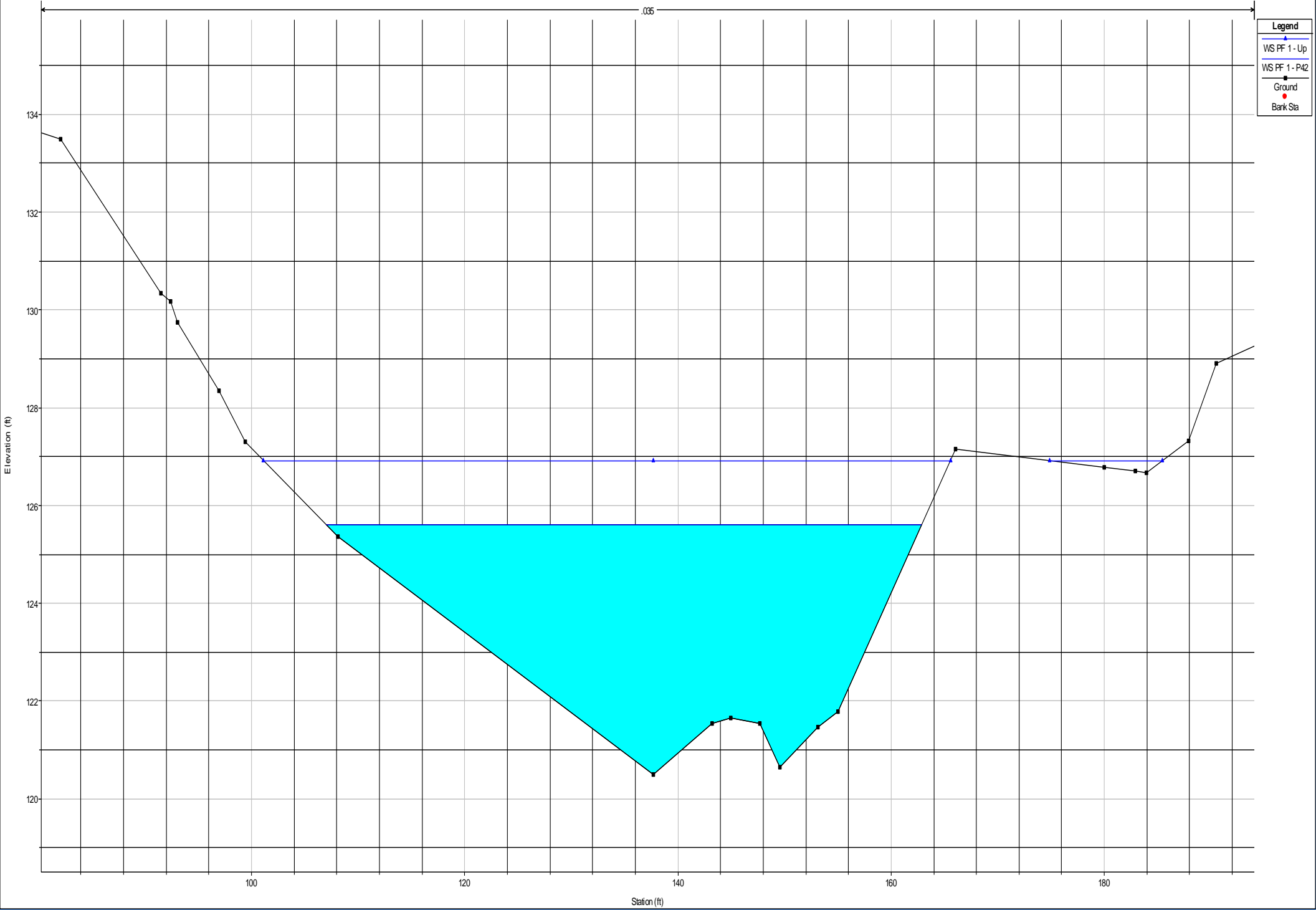


Legend

- WS PF 1 - Upper
- WS PF 1 - Low
- Ground







Georeferencing
Georeferencing Layer: AlaCik_VBF-LL-UL_v2000.dwg Poly





Georeferencing

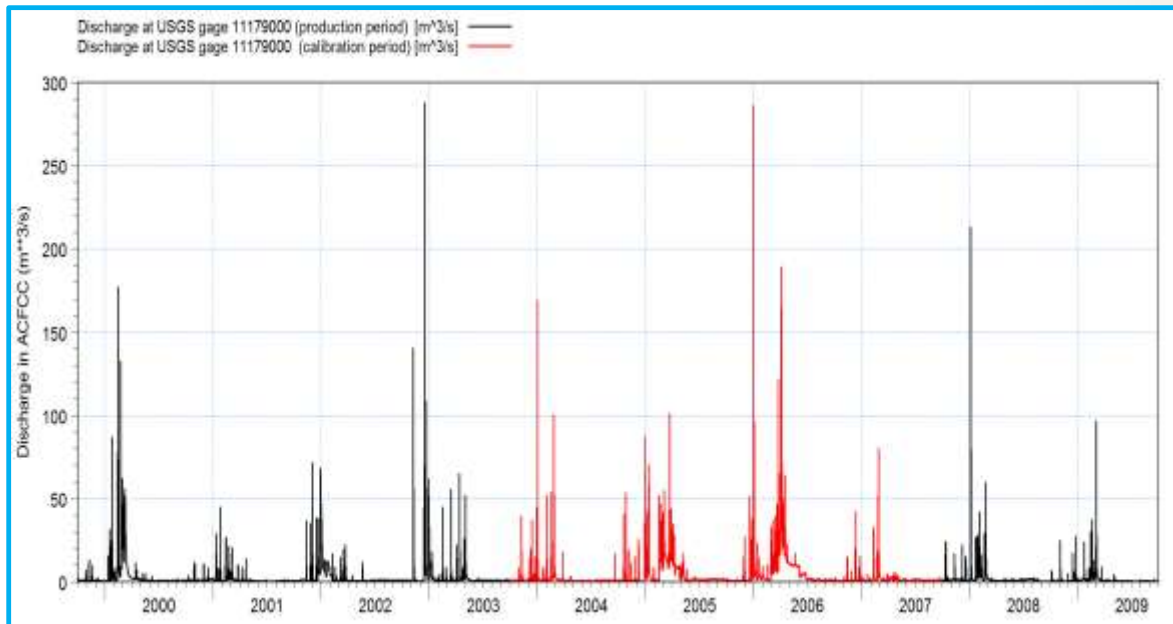
Georeferencing Layer: AlaCrk_VBF-LL-UL_v2000.dwg Poly

MIKE-21C Morphology Model



Simulation Periods

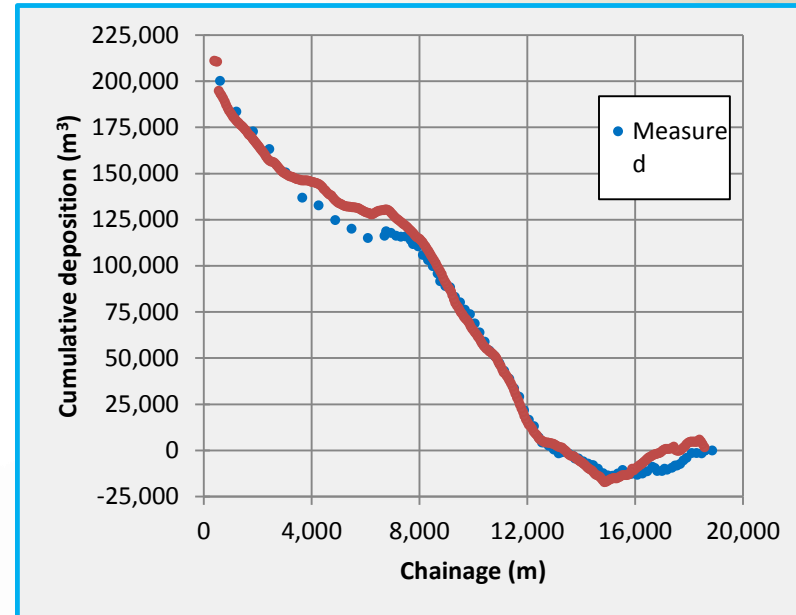
USGS gage 11179000 Alameda Creek at Niles



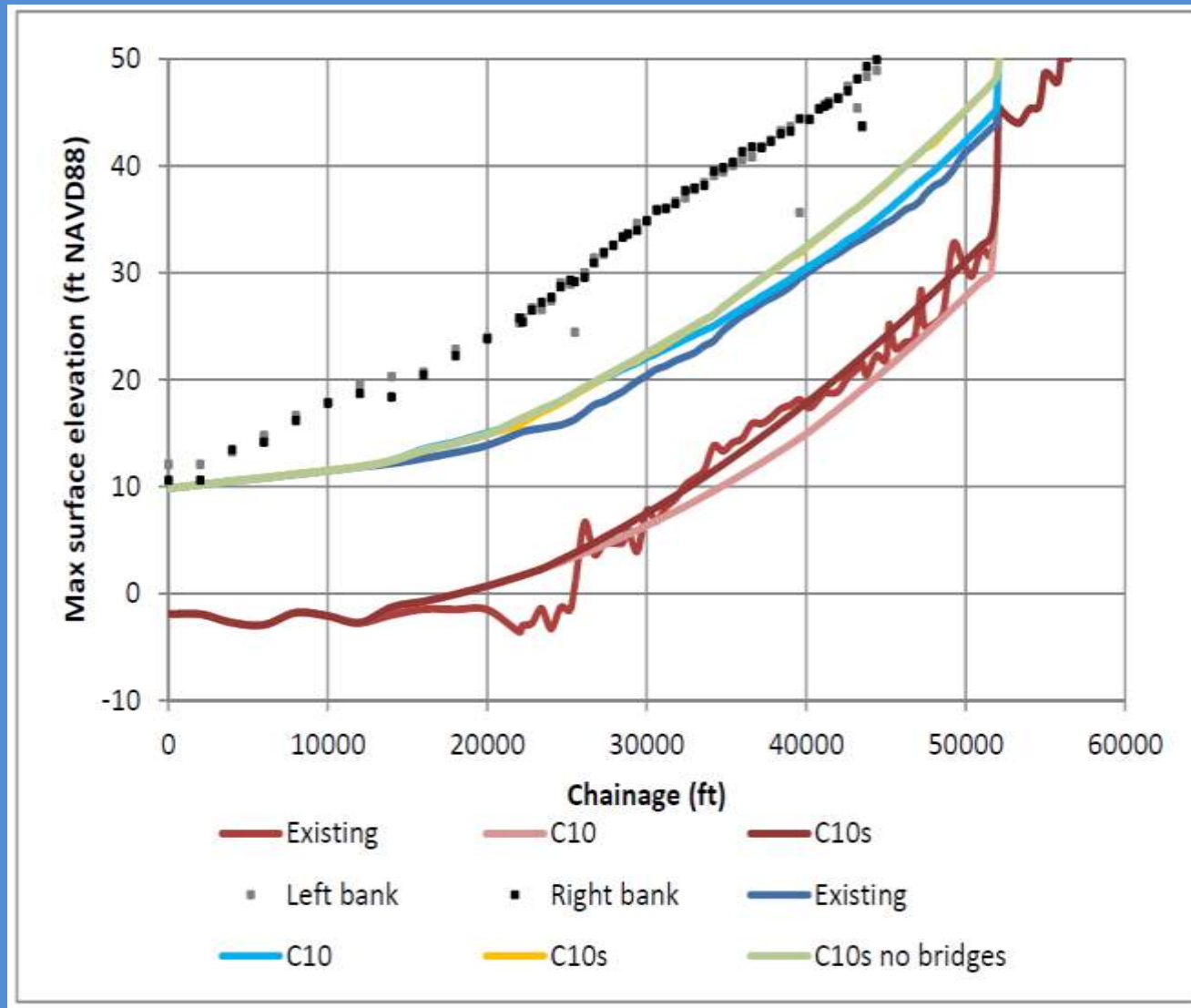
Red =
calibration
Black =
production

2D Model Calibration

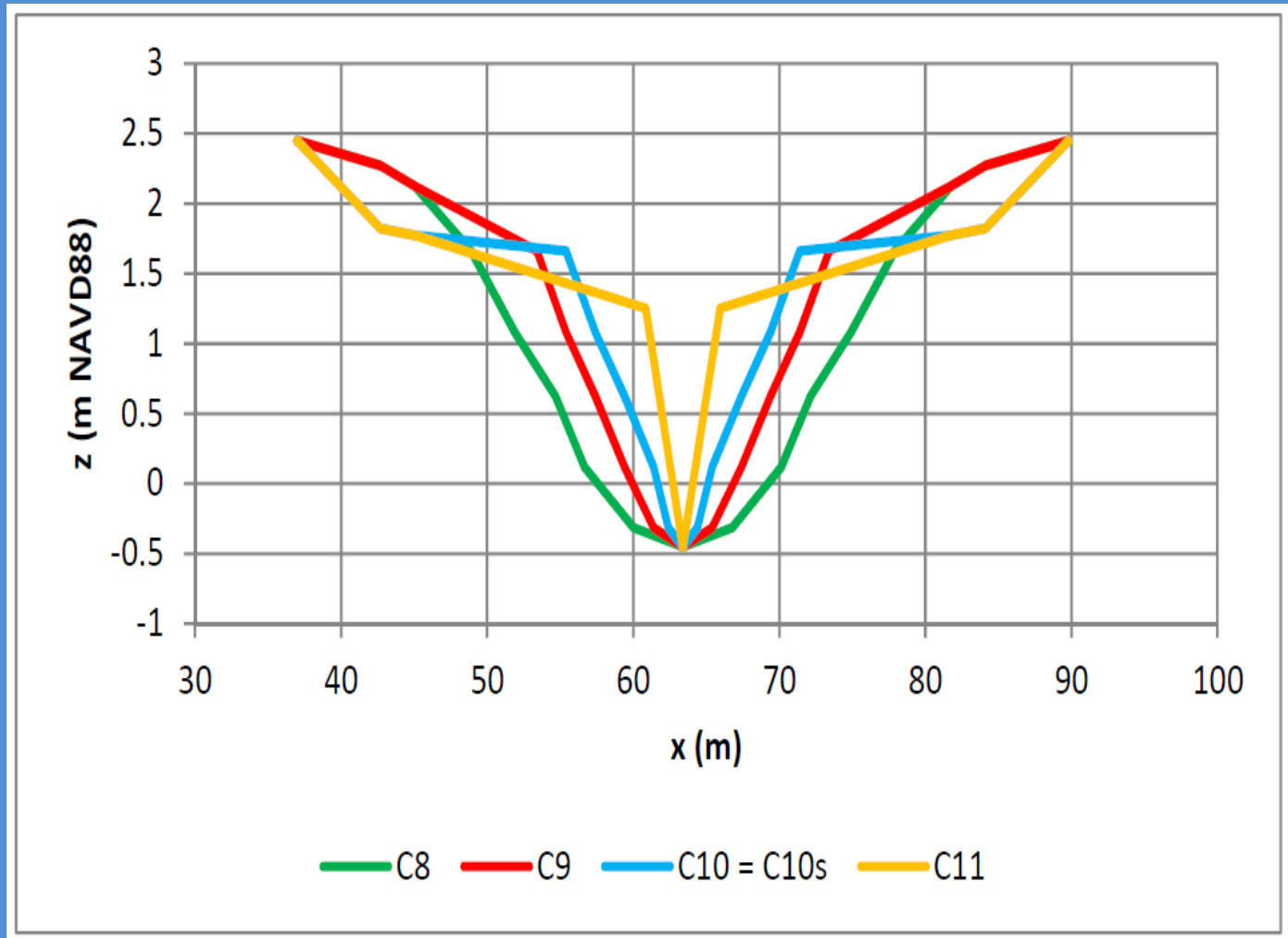
- Calibration period 2003-2009 (WY 2004-2009)
- Cumulative sediment deposition calculated from measured cross-section changes
- Model sediment transport parameters for individual fractions adjusted until agreement reached



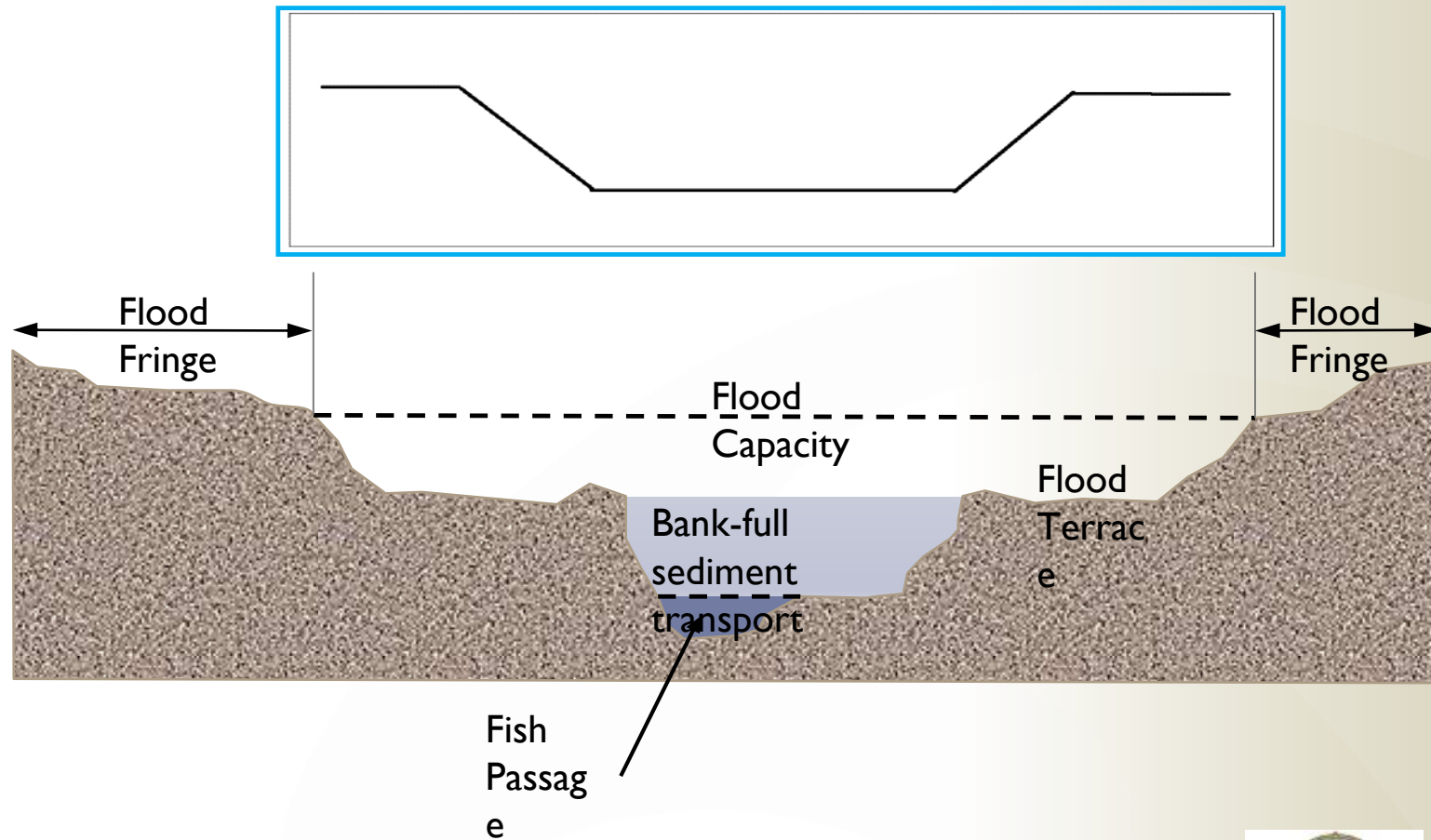
Longitudinal Slope (BART to Bay)



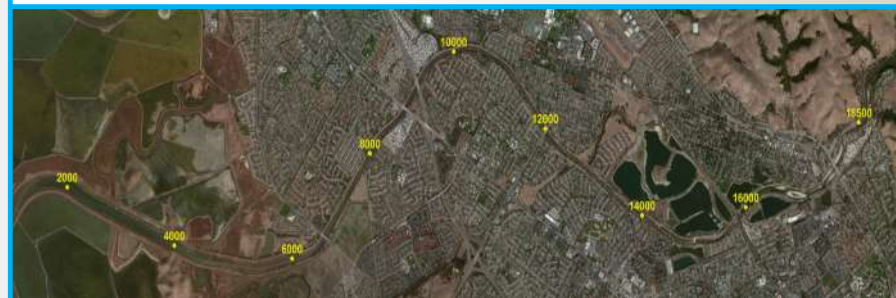
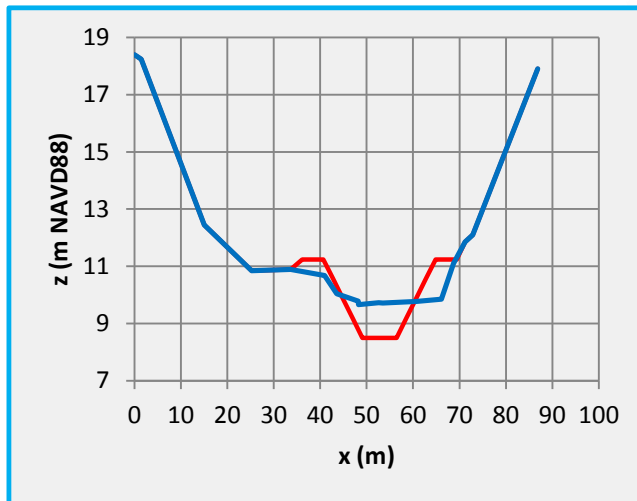
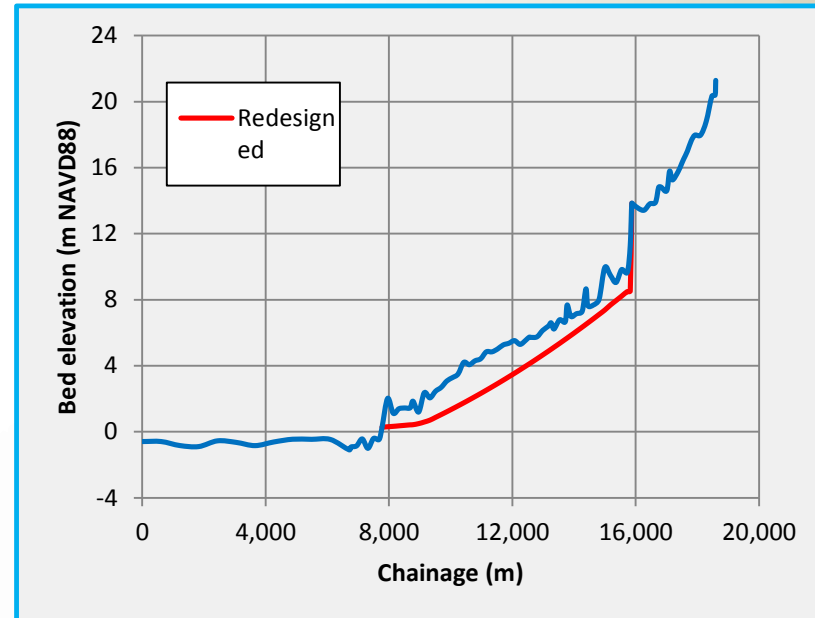
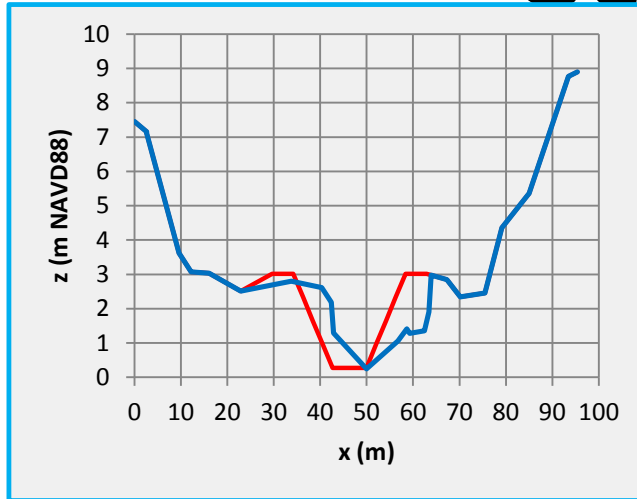
Cross Sections Tests



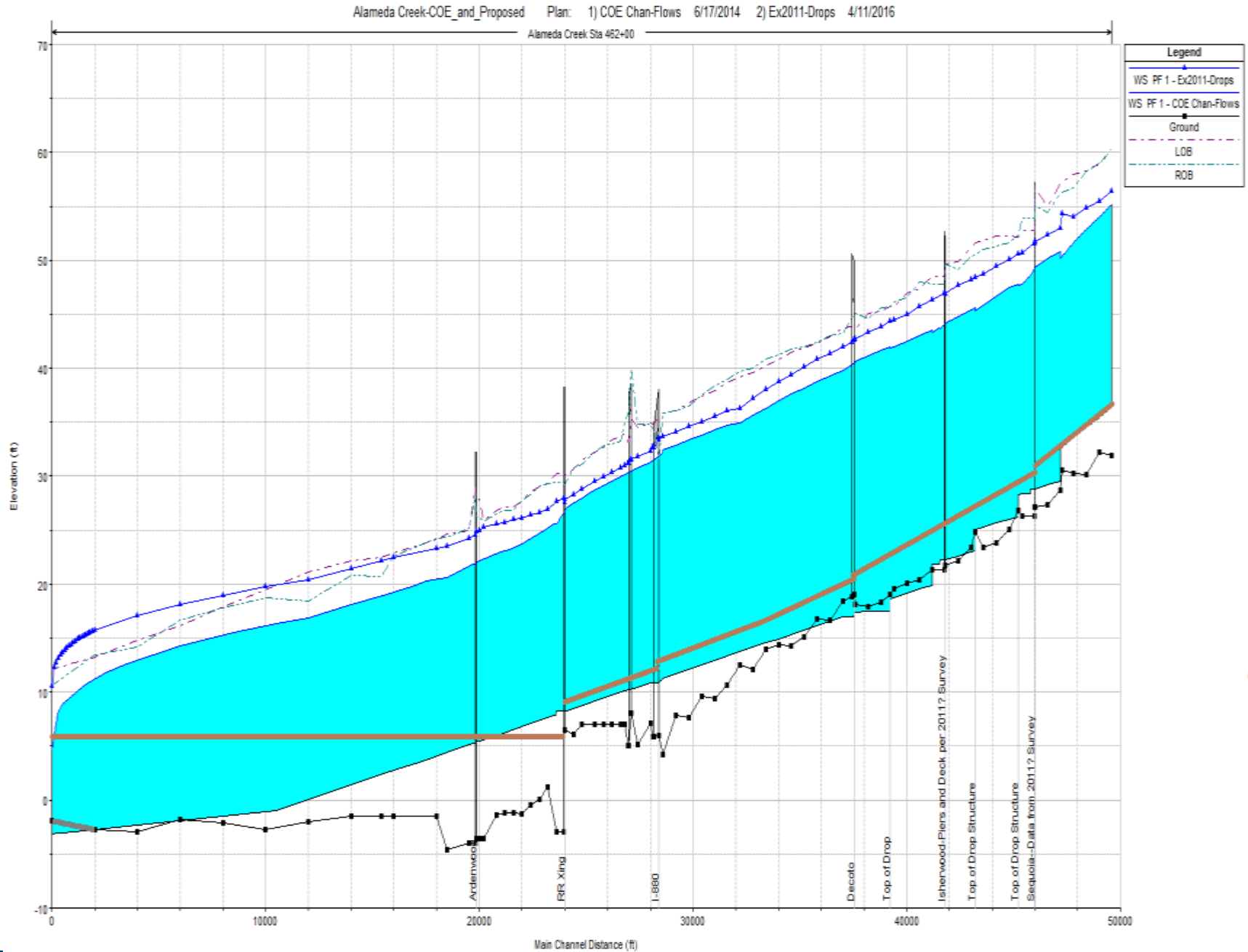
Redesign of Channel Geometry: Low Flow Channel



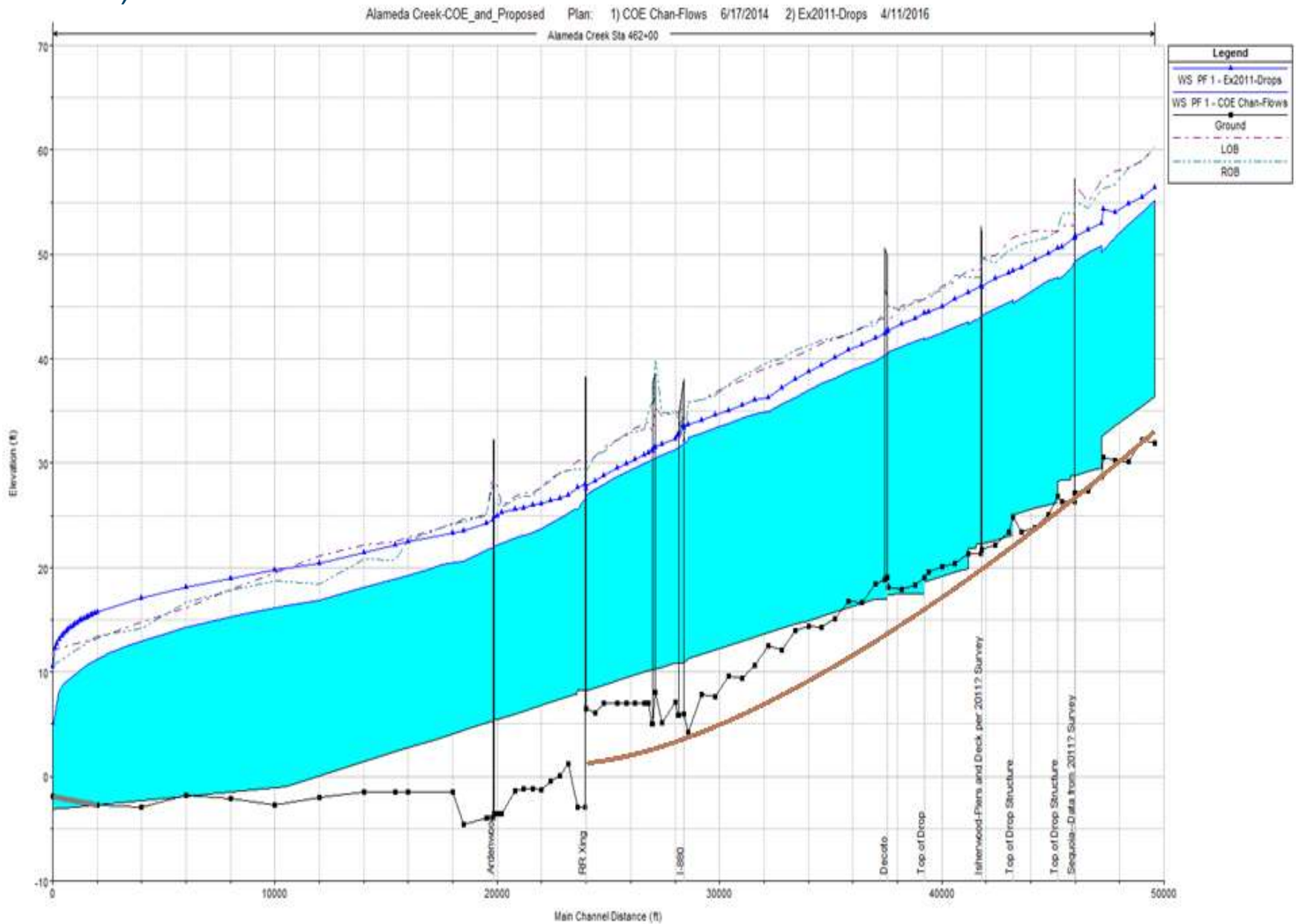
Redesign of Channel Geometry



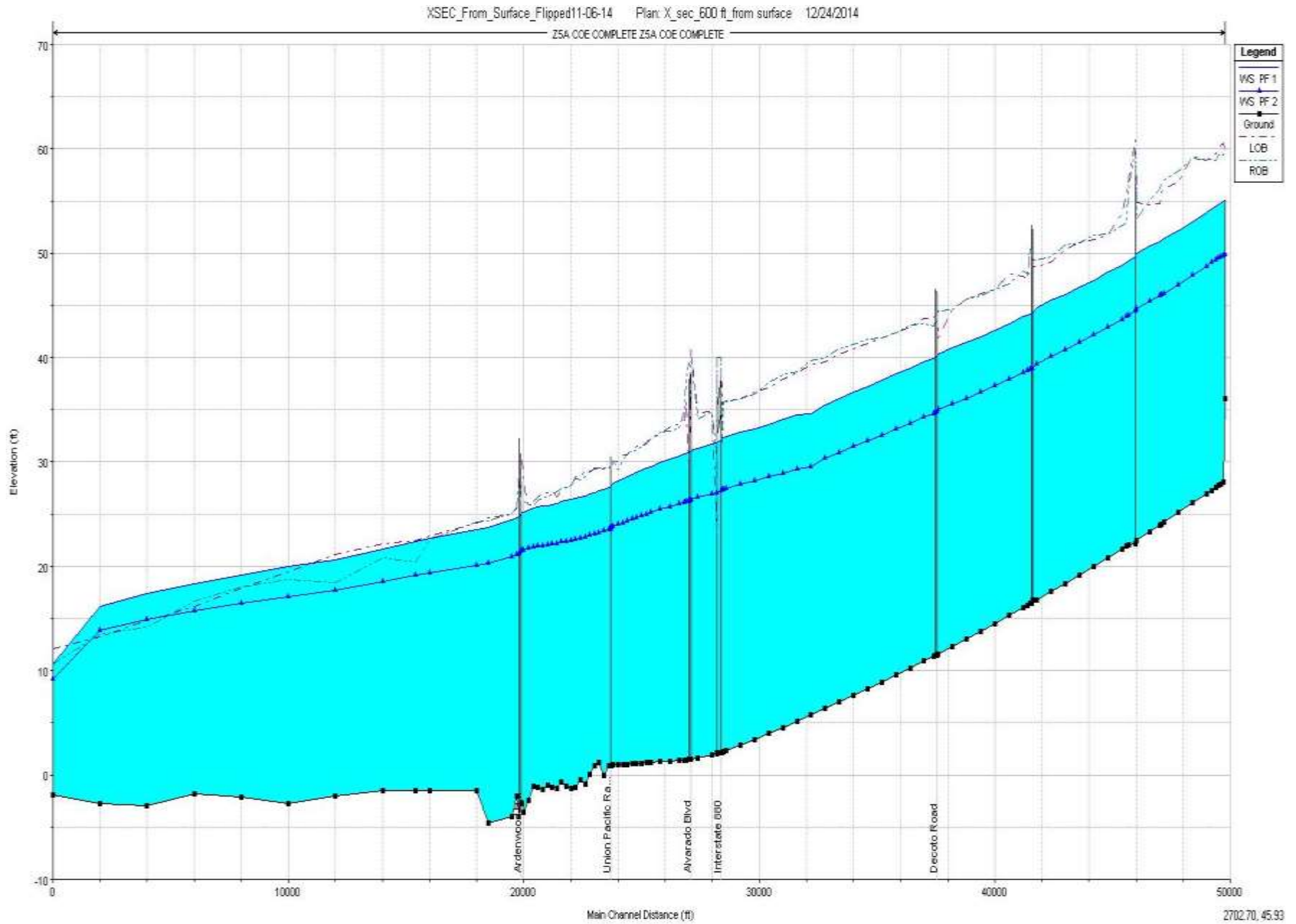
Comparison of Existing Thalweg and Flood Terrace— Bay to BART Weir



Comparison of Proposed Low Flow, Existing Thalweg and CORPS Design Geometry (Bay to BART)



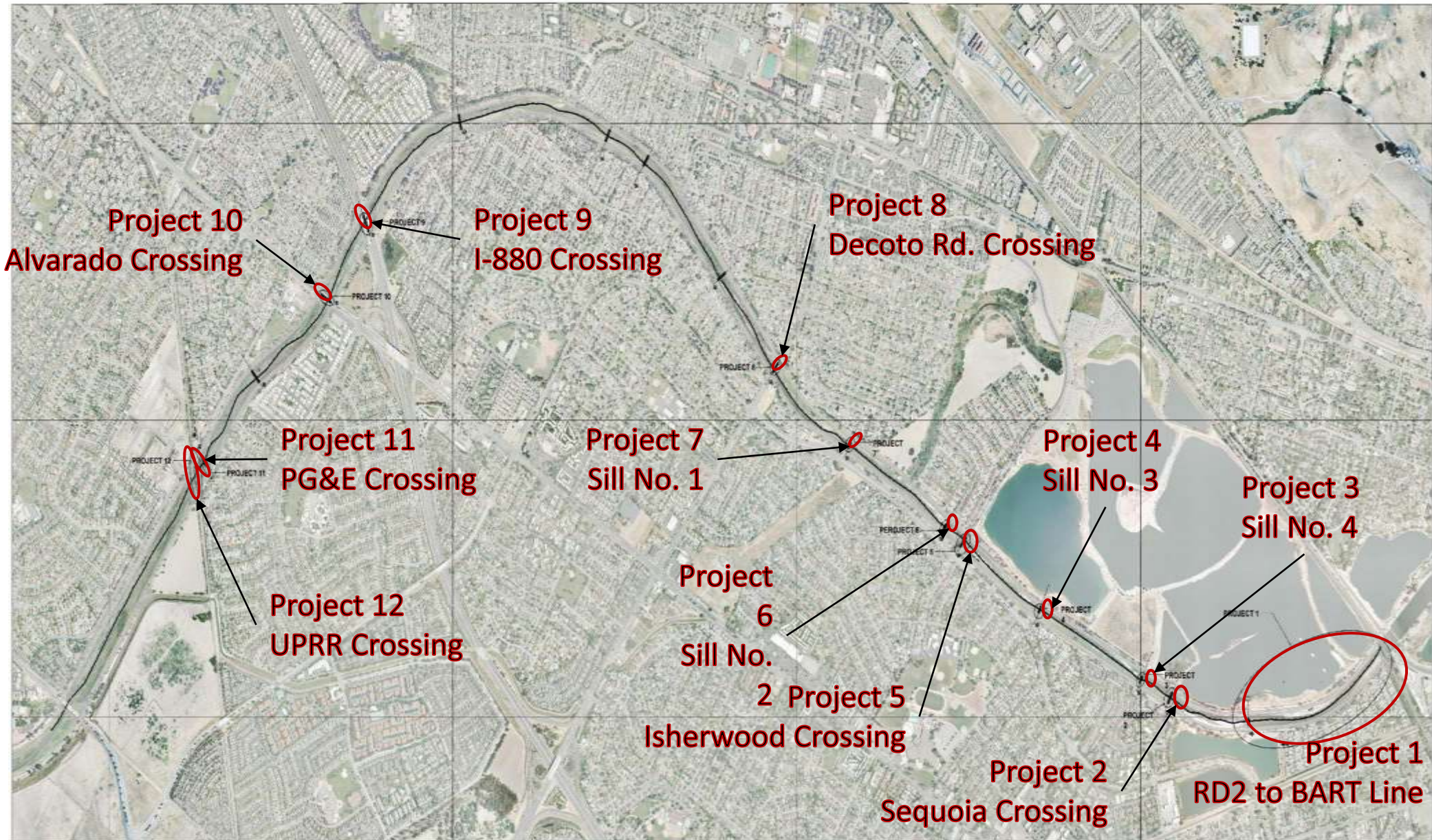
Standard Project Flood Profile– Bay to BART Weir



Proposed Projects

- Improvement of the existing low flow channel between RD-2 and BART Weir
- Notching of all the sills based on the optimized low flow channel geometry and slope
- Construction of the low flow channel under the bridges.

Alameda Creek Fish Passage Improvement Projects



Alameda Creek

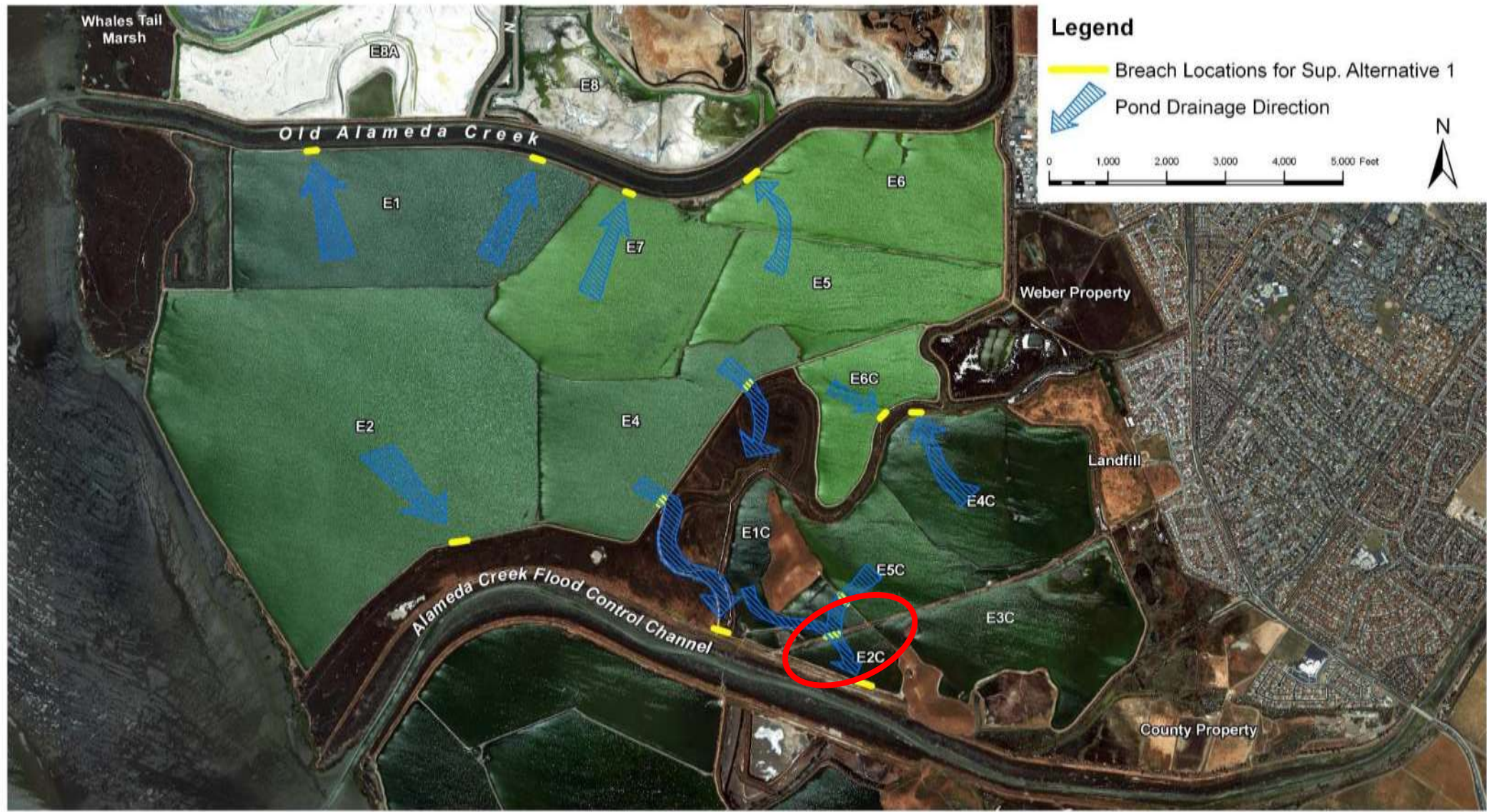
Anticipated Construction Schedule for Upcoming Planned Improvement Projects

| Project No. | Project | Lead Agency | Anticipated Year of Construction | Estimated Construction Cost |
|-------------|--|--|----------------------------------|-----------------------------|
| 1 | Fish Ladder at BART Weir and RD 1 | ACWD; (Joint Project with District) | 2018 | \$ 14,000,000 |
| 2 | Channel Restoration from RD 2 to Brite Line | District (Joint Project with ACWD) | 2018 | \$ 2,700,000 |
| 3 | Channel Restoration at Sills 3 and 4 | District | 2019 | \$ 2,500,000 |
| 4 | Channel Restoration at Sills 1 and 2 | District | 2020 | \$ 2,500,000 |
| 5 | Raise North and South Levees I-880 to Alvarado Rd. | District | 2022 | \$ 4,500,000 |
| 6 | Channel Restoration near Sequoia Crossing | District | 2024 | \$ 3,500,000 |
| 7 | Channel Restoration near Isherwood Way Bridge | District | 2026 | \$ 2,700,000 |
| 8 | Channel Restoration near Decoto Road Bridge | District | 2027 | \$ 2,200,000 |
| 9 | Channel Restoration at I-880 | District | 2029 | \$ 4,100,000 |
| 10 | Channel Rest. at Alvarado and PG&E Crossings | District | 2031 | \$ 3,400,000 |
| 11 | Channel Restoration at UPRR Crossing | District | 2034 | \$ 4,200,000 |
| | | | TOTAL | \$ 46,300,000 |

Eden Area Restoration
Phase-II and Alameda
Creek Connectivity

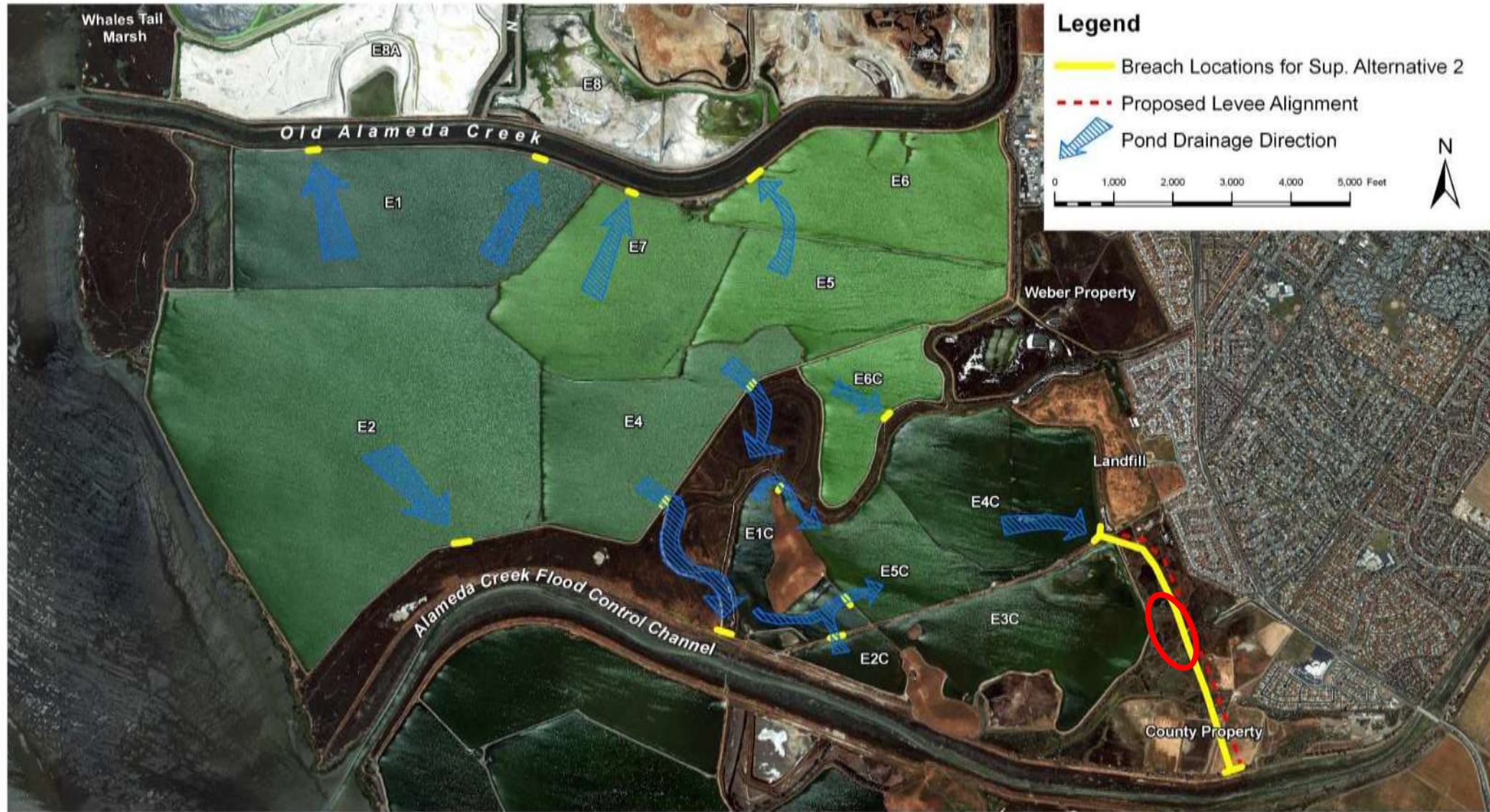
Levee Breach Locations

Supplemental Alternative 1



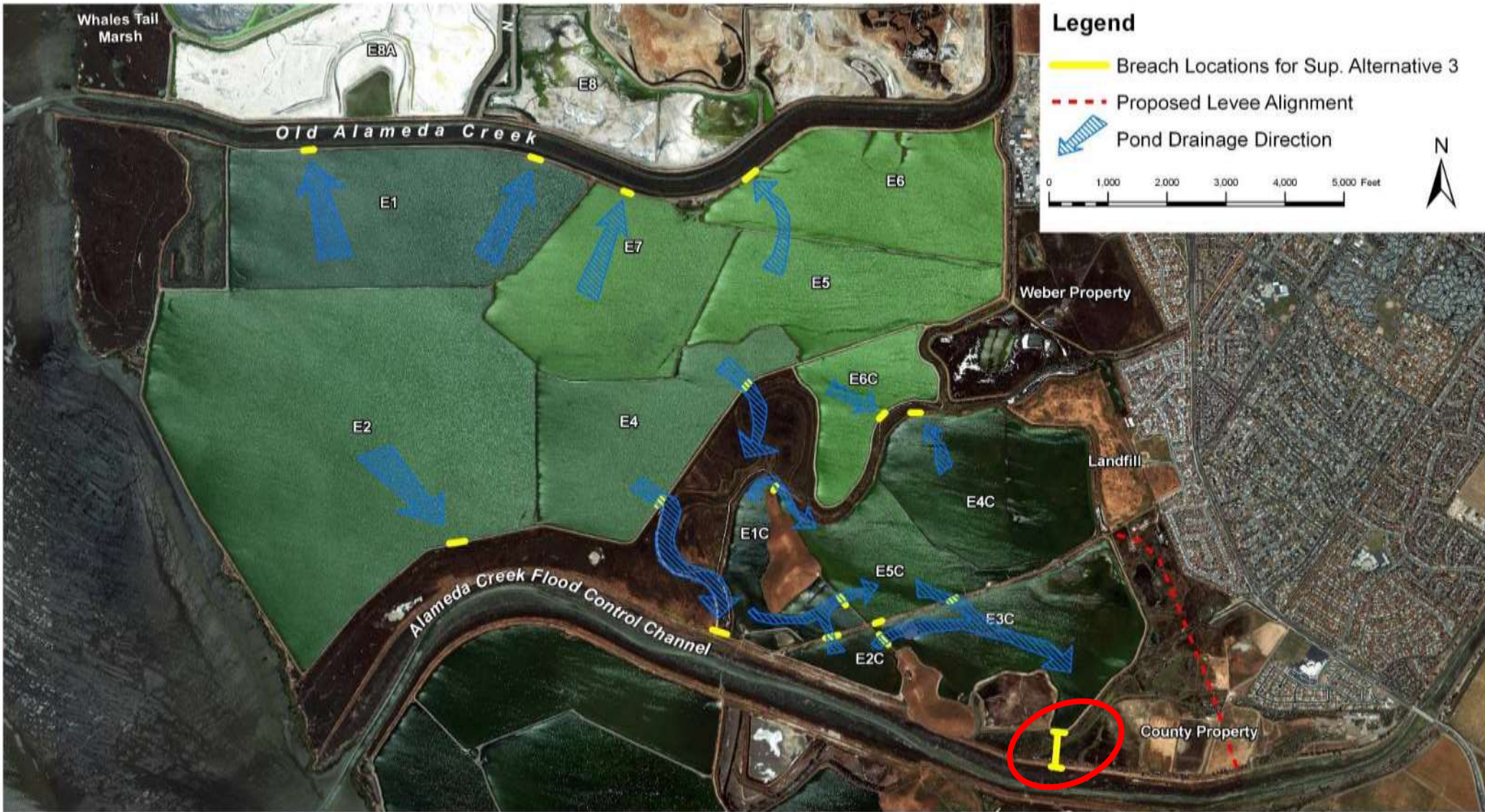
Levee Breach Locations

Supplemental Alternative 2

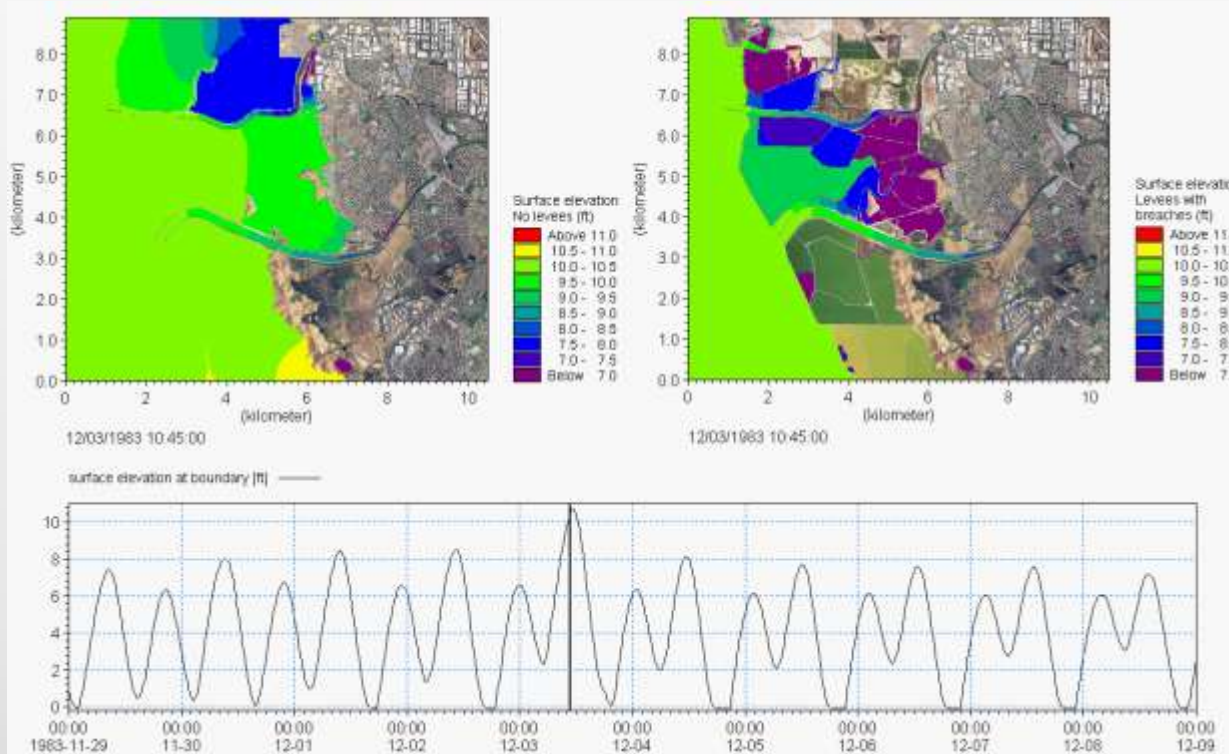


Levee Breach Locations

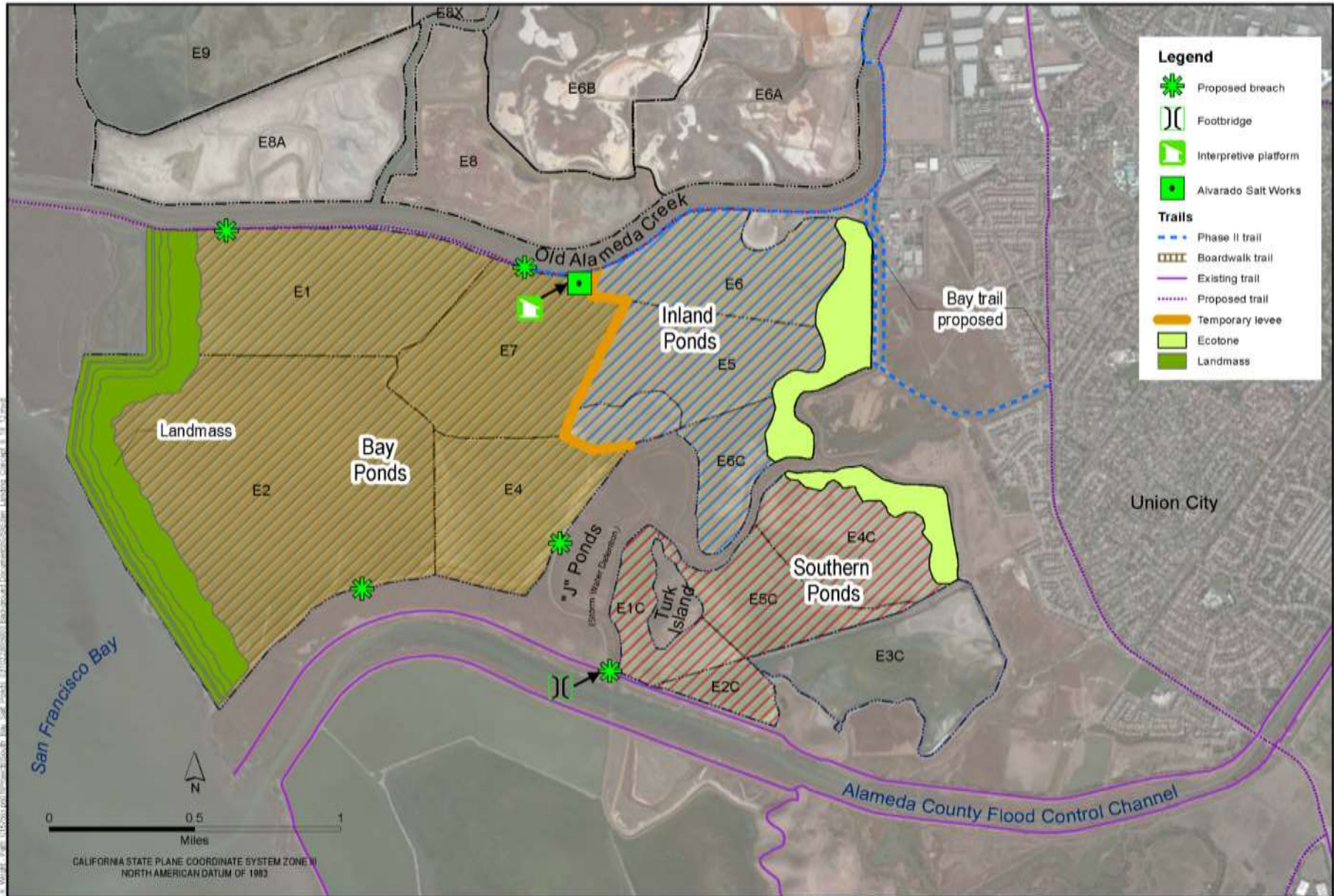
Supplemental Alternative 3



Eden Area Phase-II Alternative Evaluations



- ▶ Need for optimized restoration
- ▶ Consideration for combined fluvial and coastal flooding



Legend

- Proposed breach
- Footbridge
- Interpretive platform
- Alvarado Salt Works

Trails

- Phase II trail
- Boardwalk trail
- Existing trail
- Proposed trail
- Temporary levee
- Ecotone
- Landmass

E:\GIS\Projects\2012\20120815_South Bay Salt Ponds Eden Landing\Map_Series\Map_Series_01_South Bay Salt Ponds Eden Landing\Map_Series_01_South Bay Salt Ponds Eden Landing.mxd
 8/18/2012 10:11:11 AM

CALIFORNIA STATE PLANE COORDINATE SYSTEM ZONE 10
 NORTH AMERICAN DATUM OF 1983

URS
 SOUTH BAY SALT PONDS
 EDEN LANDING
 ALAMEDA COUNTY, CA

DATE OF PREPARATION: 9/18/2012
 DRAFT, FOR INTERNAL USE ONLY
 URS PROJECT NO. 26818346









**DRAFT PREFERRED ALTERNATIVE
 EDEN LANDING POND COMPLEX**

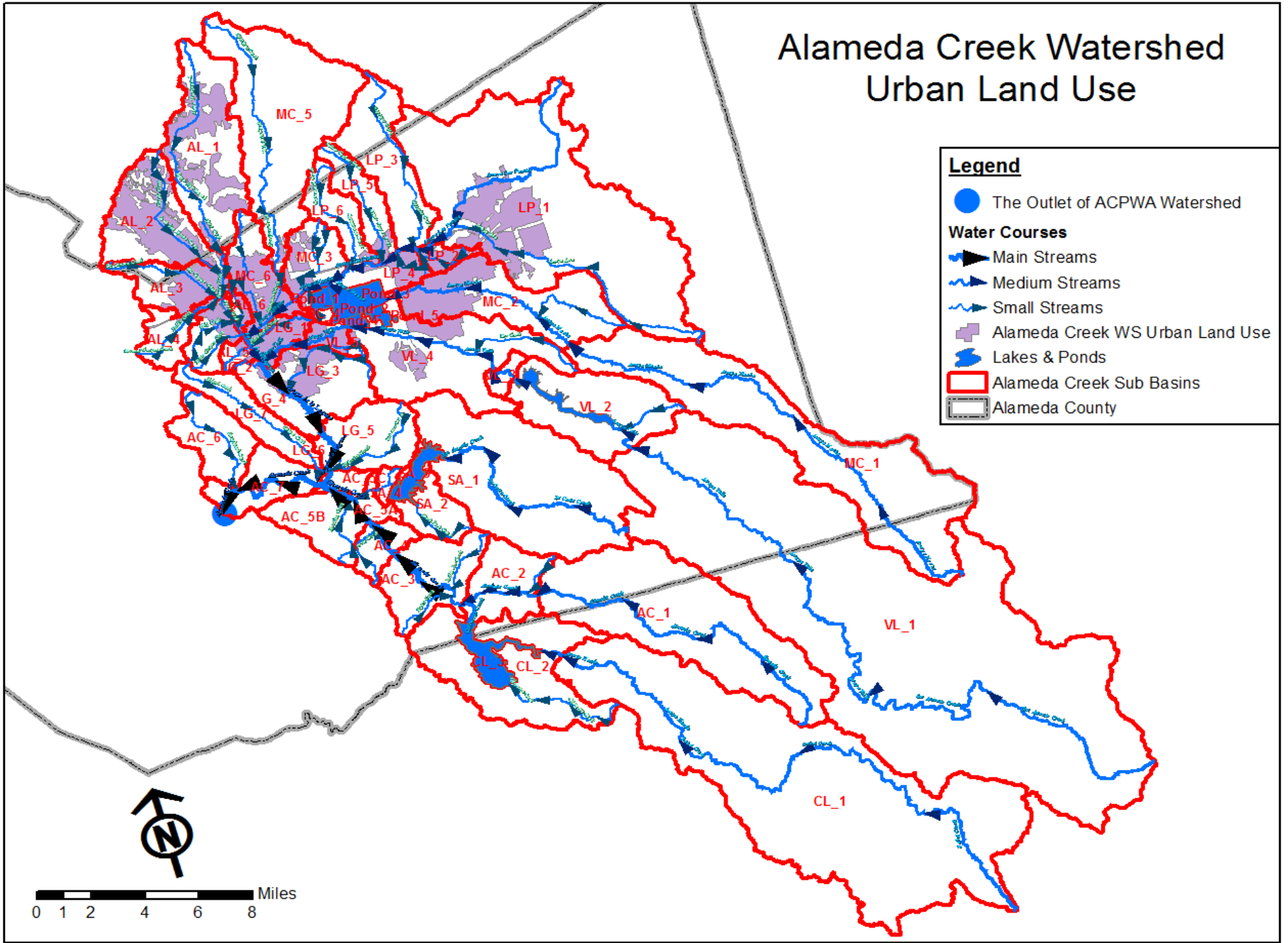
Alameda Creek Hydrology Model (ACHM)

- No large scale watershed based hydrologic studies since the CORPS initial design of the Federal Project
- General feeling that the Federal Project was overdesigned.
- Can we use the overdesigned capacity to plant trees and introduce additional frictions

Alameda Creek Watershed Urban Land Use










Legend

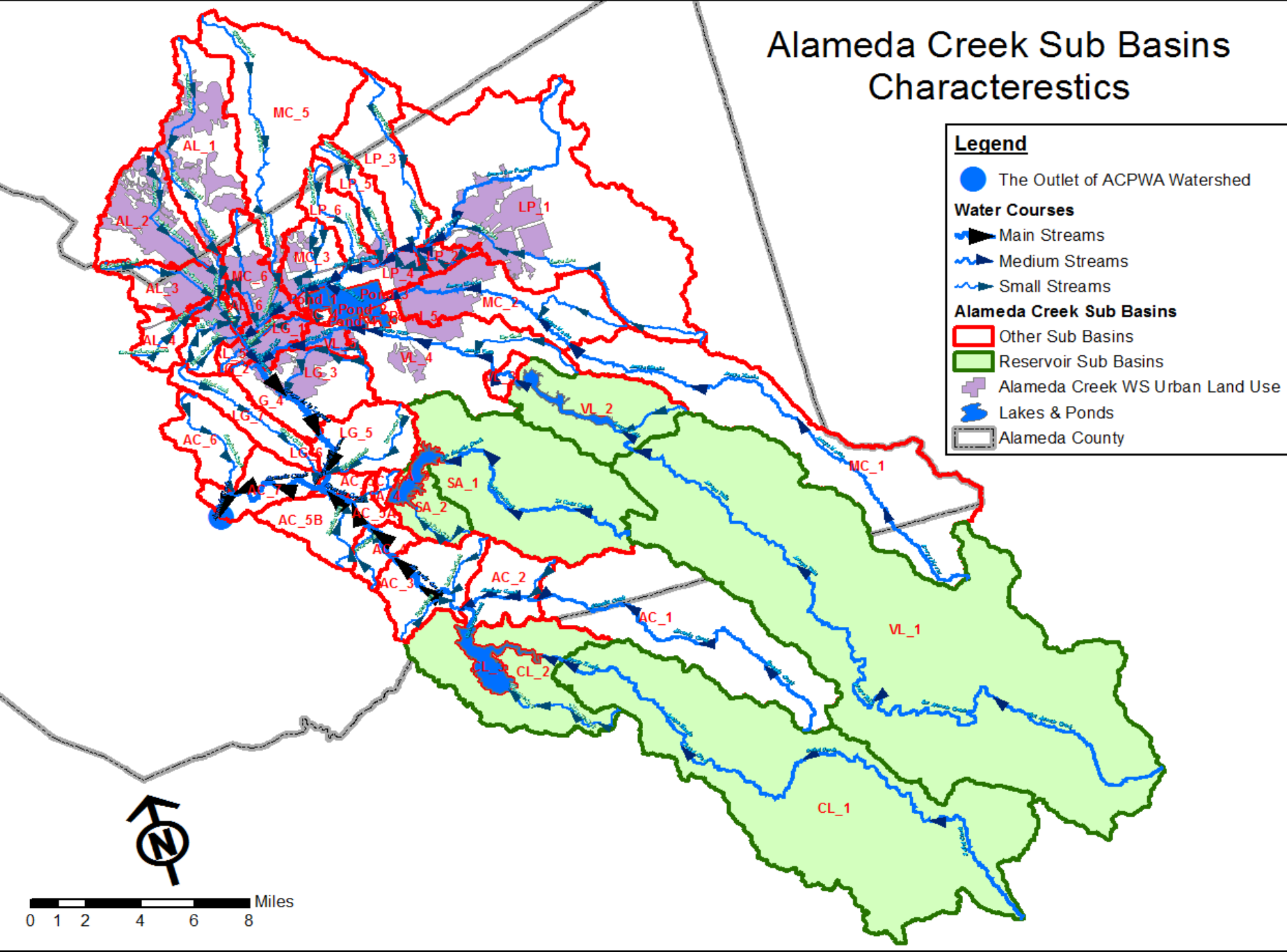
-  The Outlet of ACPWA Watershed
- Water Courses**
 -  Main Streams
 -  Medium Streams
 -  Small Streams
-  Alameda Creek WS Urban Land Use
-  Lakes & Ponds
-  Alameda Creek Sub Basins
-  Alameda County



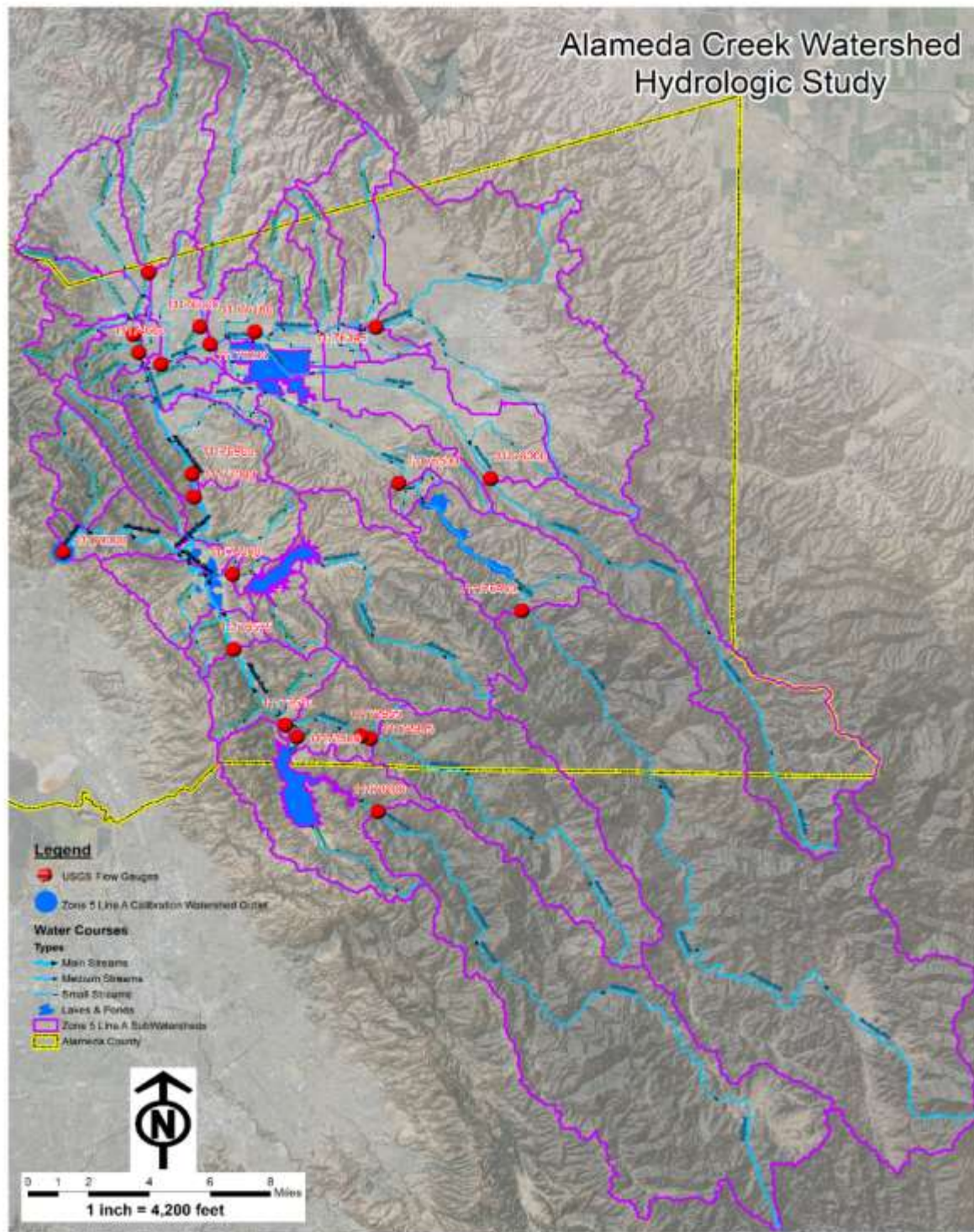
Alameda Creek Sub Basins Characteristics

Legend

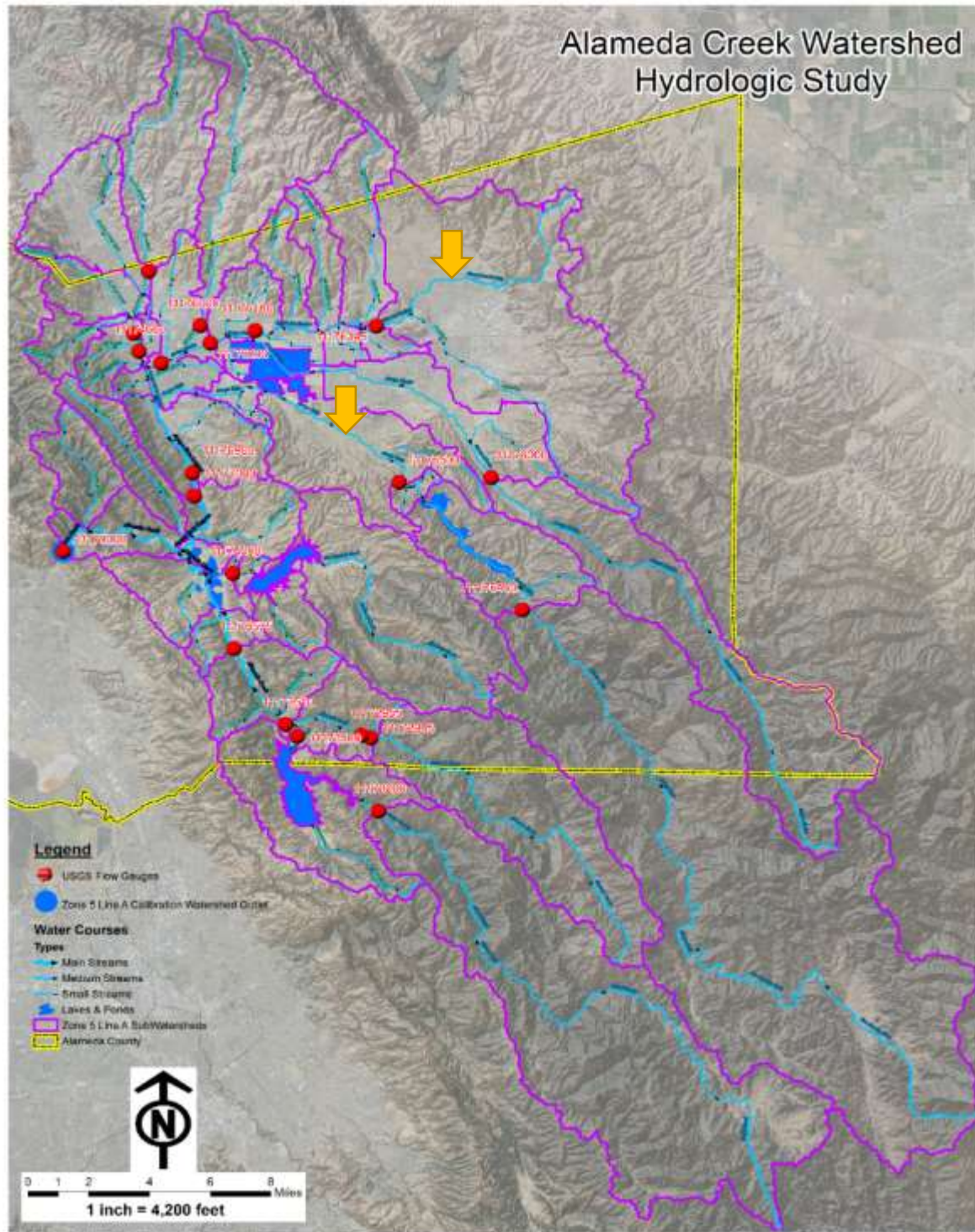
-  The Outlet of ACPWA Watershed
- Water Courses**
 -  Main Streams
 -  Medium Streams
 -  Small Streams
- Alameda Creek Sub Basins**
 -  Other Sub Basins
 -  Reservoir Sub Basins
 -  Alameda Creek WS Urban Land Use
 -  Lakes & Ponds
 -  Alameda County



Alameda Creek Watershed Hydrologic Study



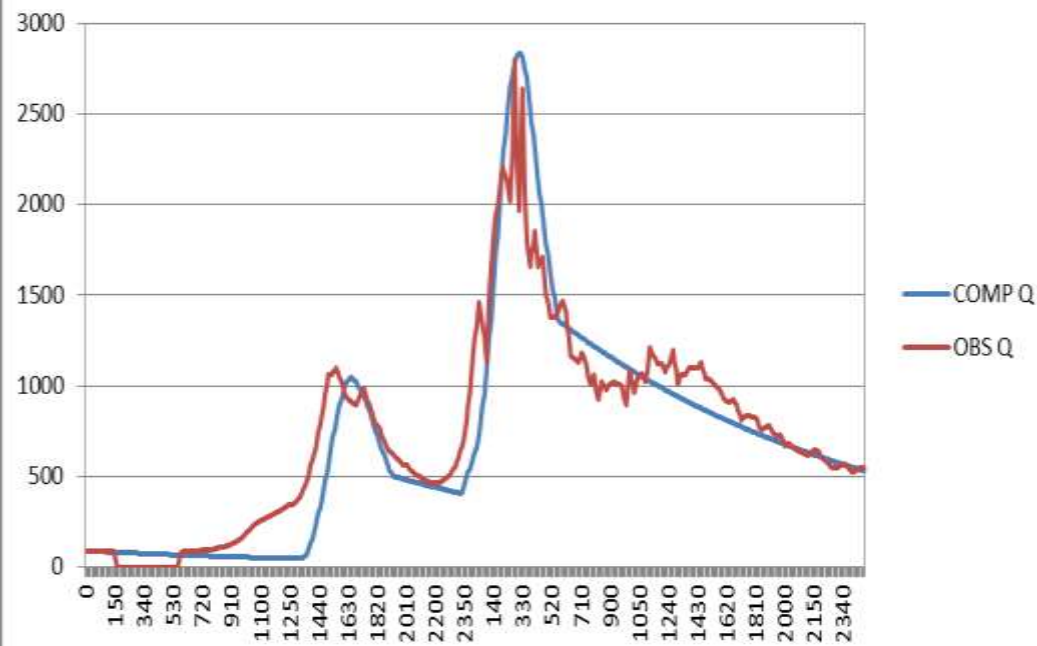
Alameda Creek Watershed Hydrologic Study



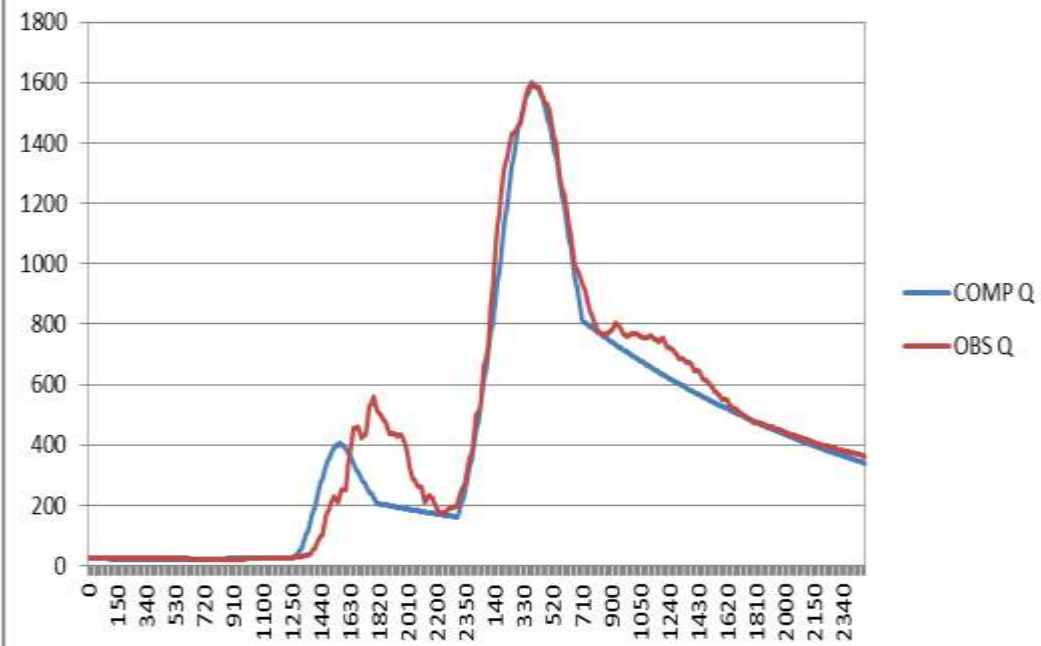


February 1998 Event

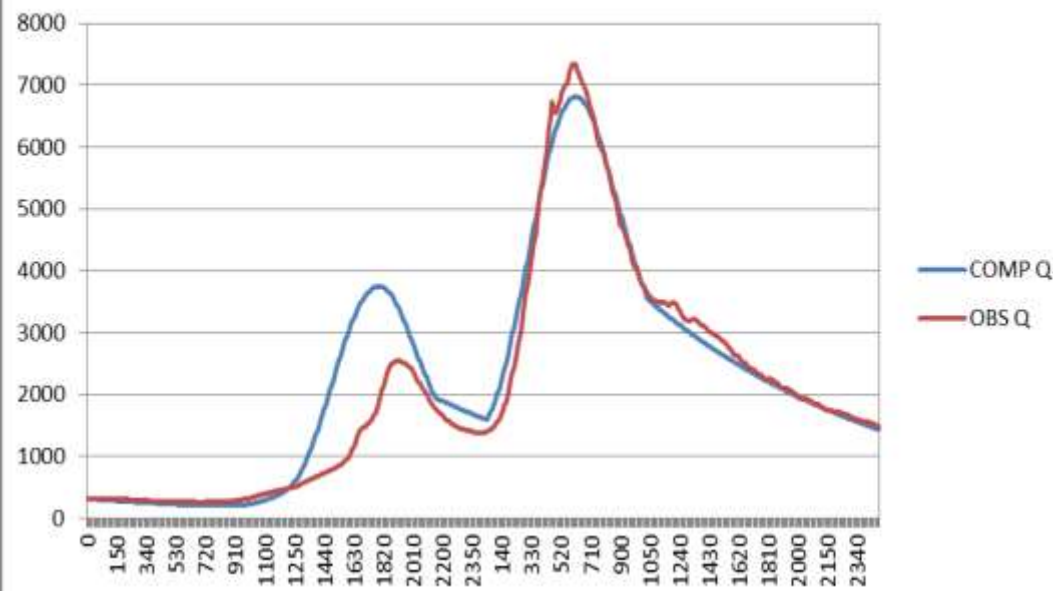
HYDROGRAPH AT STATION AIAbDv
February 2-3, 1998



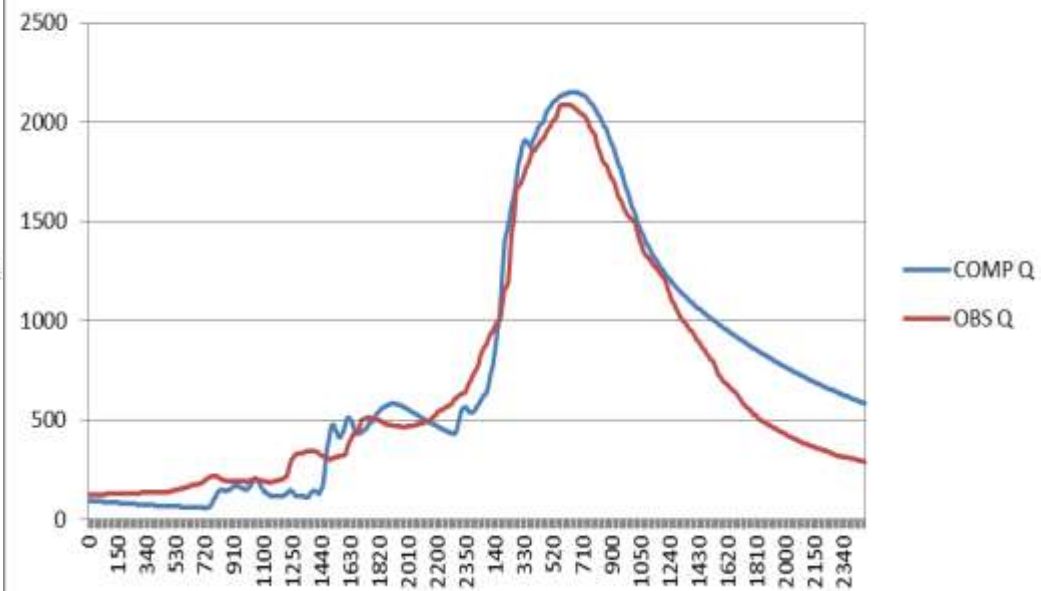
HYDROGRAPH AT STATION MochNL
February 2-3, 1998



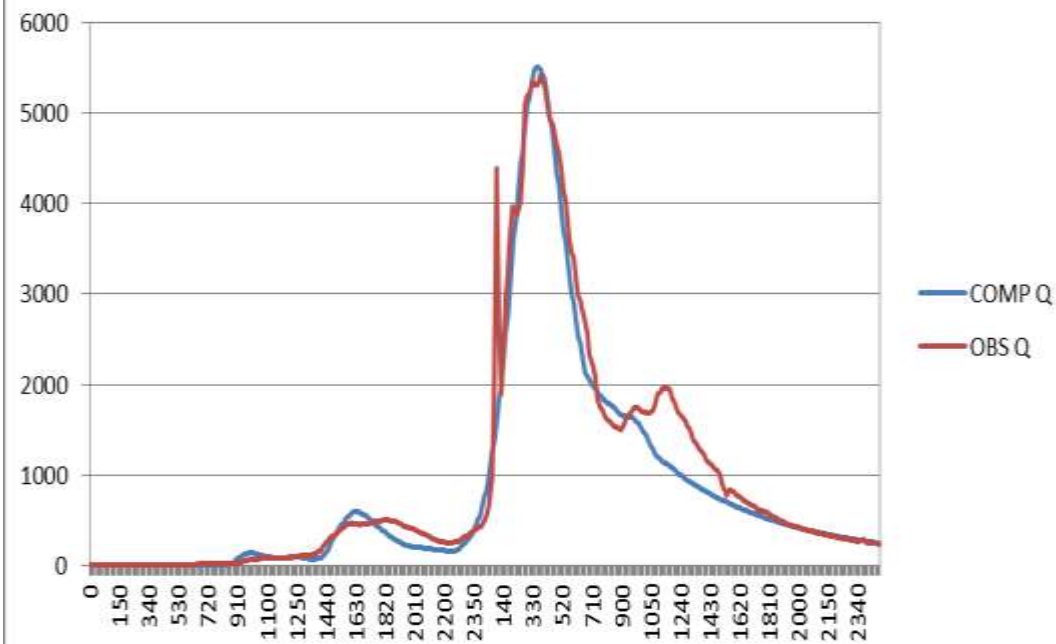
HYDROGRAPH AT STATION Hondo
February 2-3, 1998



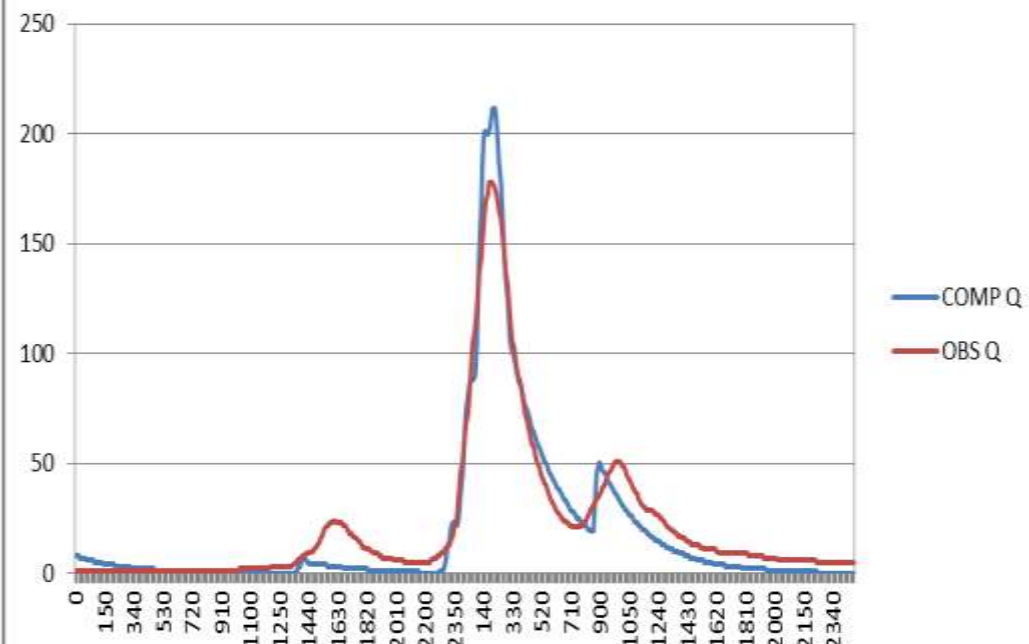
HYDROGRAPH AT STATION Mochls
February 2-3, 1998



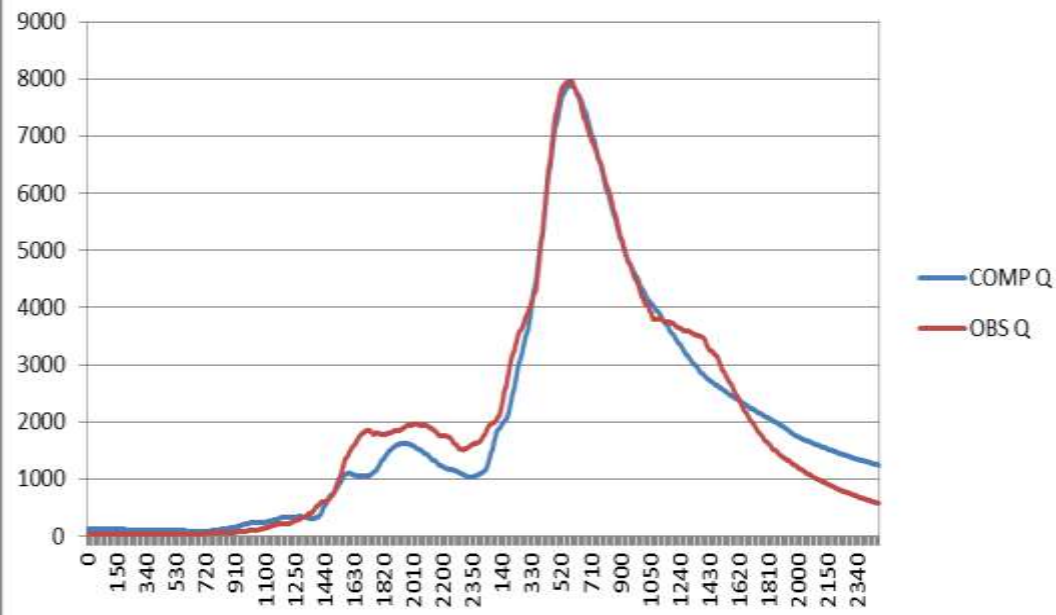
HYDROGRAPH AT STATION LPosLv
February 2-3, 1998



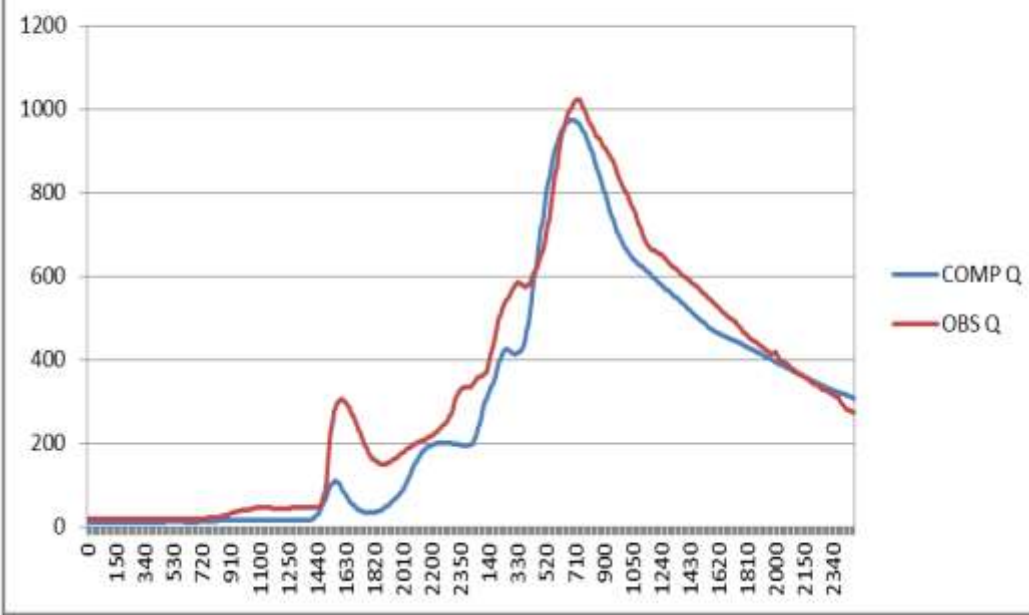
HYDROGRAPH AT STATION VINrLv
February 2-3, 1998



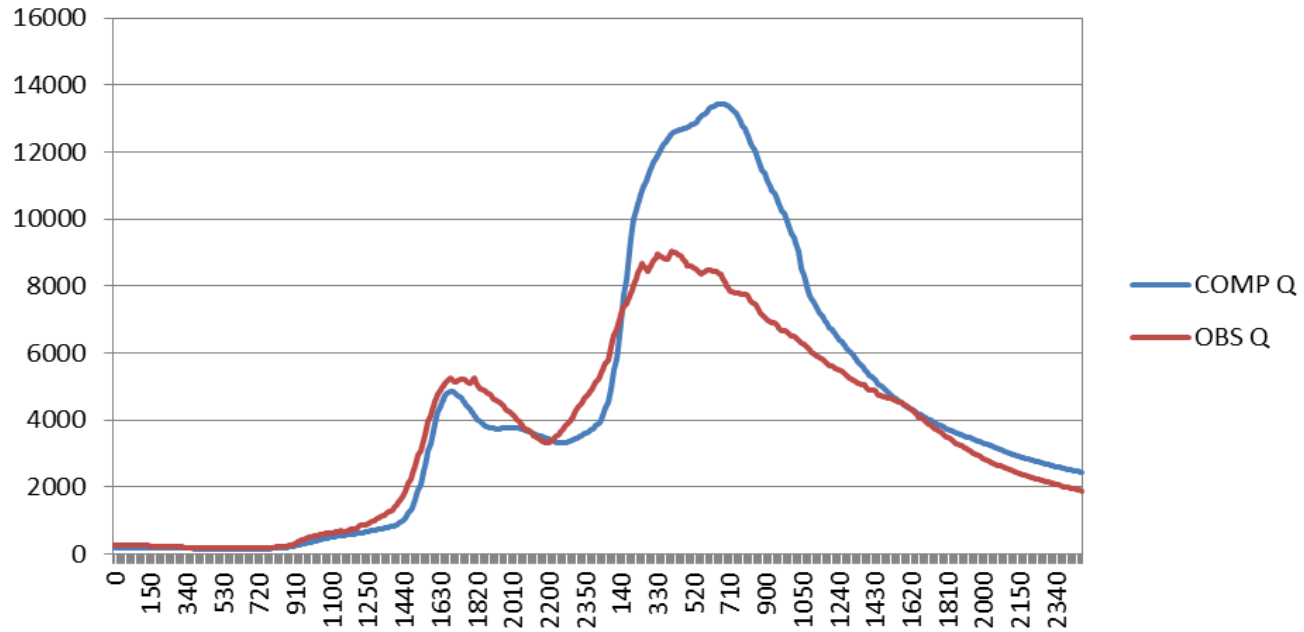
HYDROGRAPH AT STATION MochPI
February 2-3, 1998



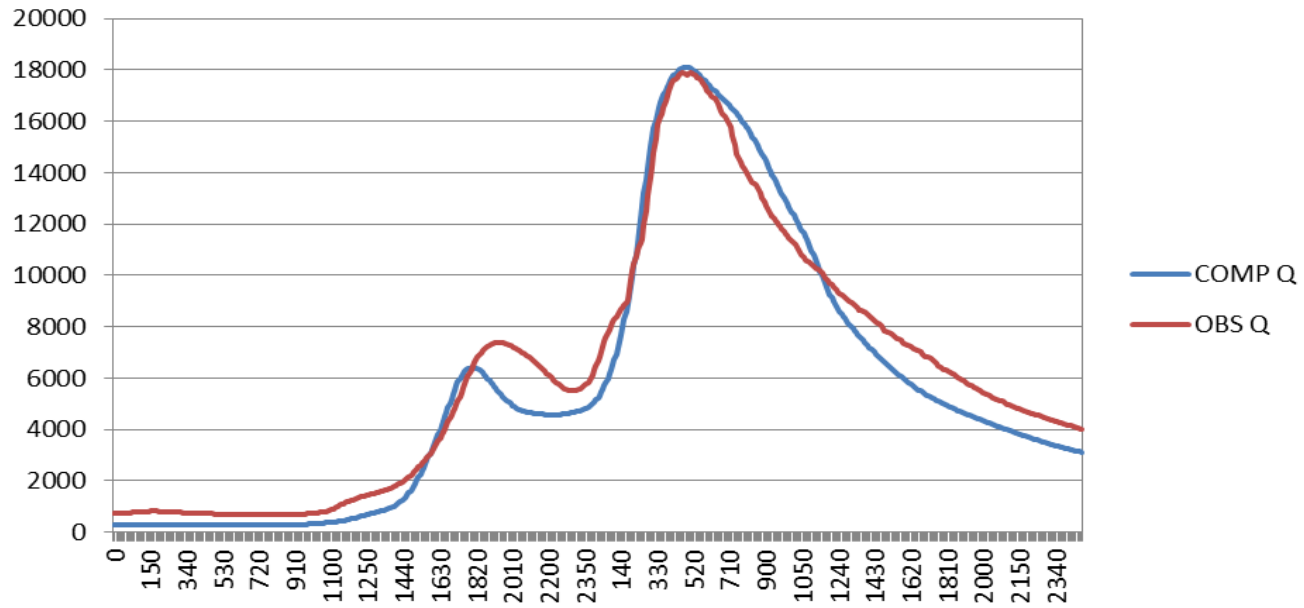
HYDROGRAPH AT STATION VIPIsn
February 2-3, 1998



HYDROGRAPH AT STATION LagunaBr
February 2-3, 1998

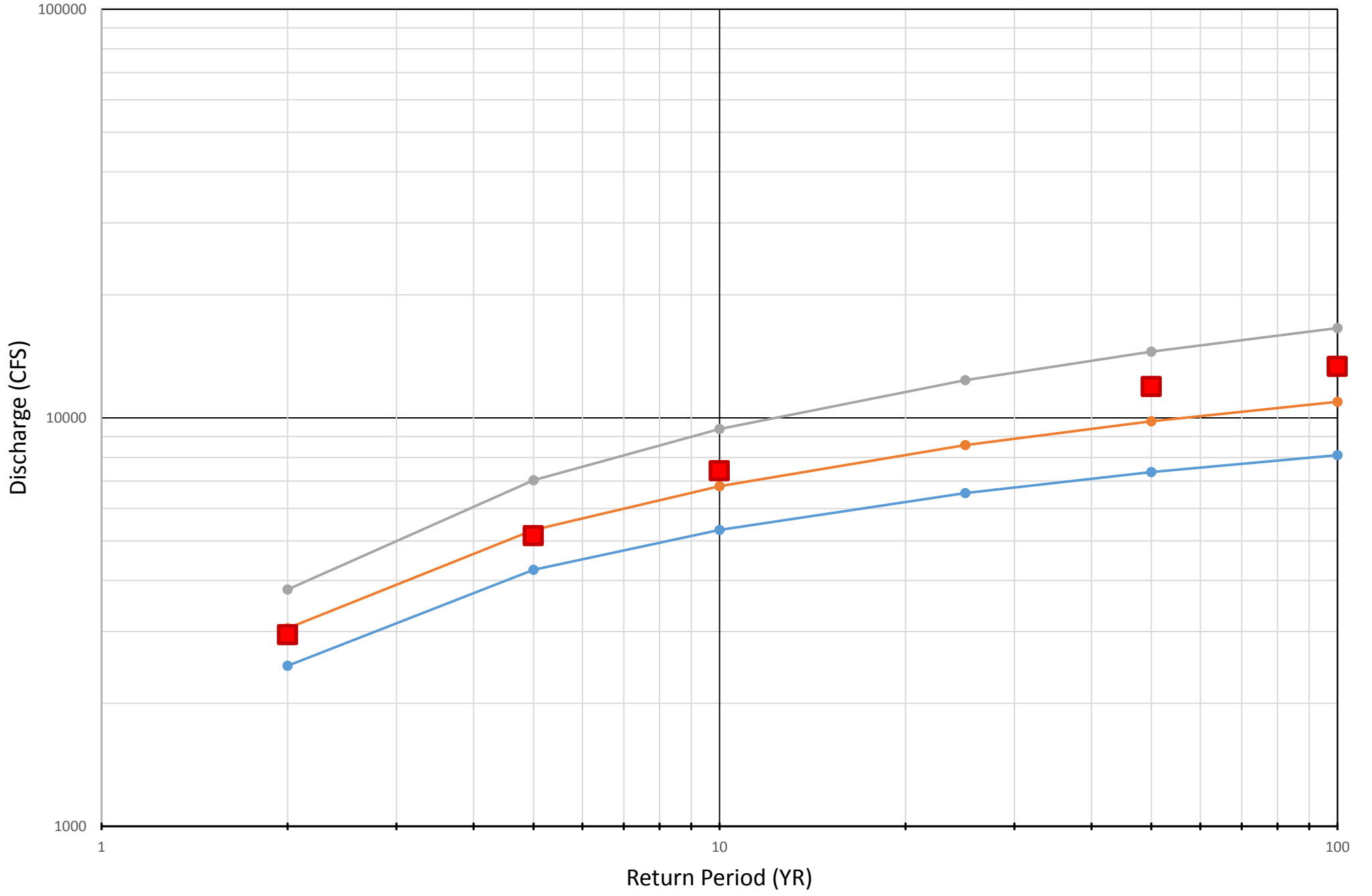


HYDROGRAPH AT STATION AlNile
February 2-3, 1998



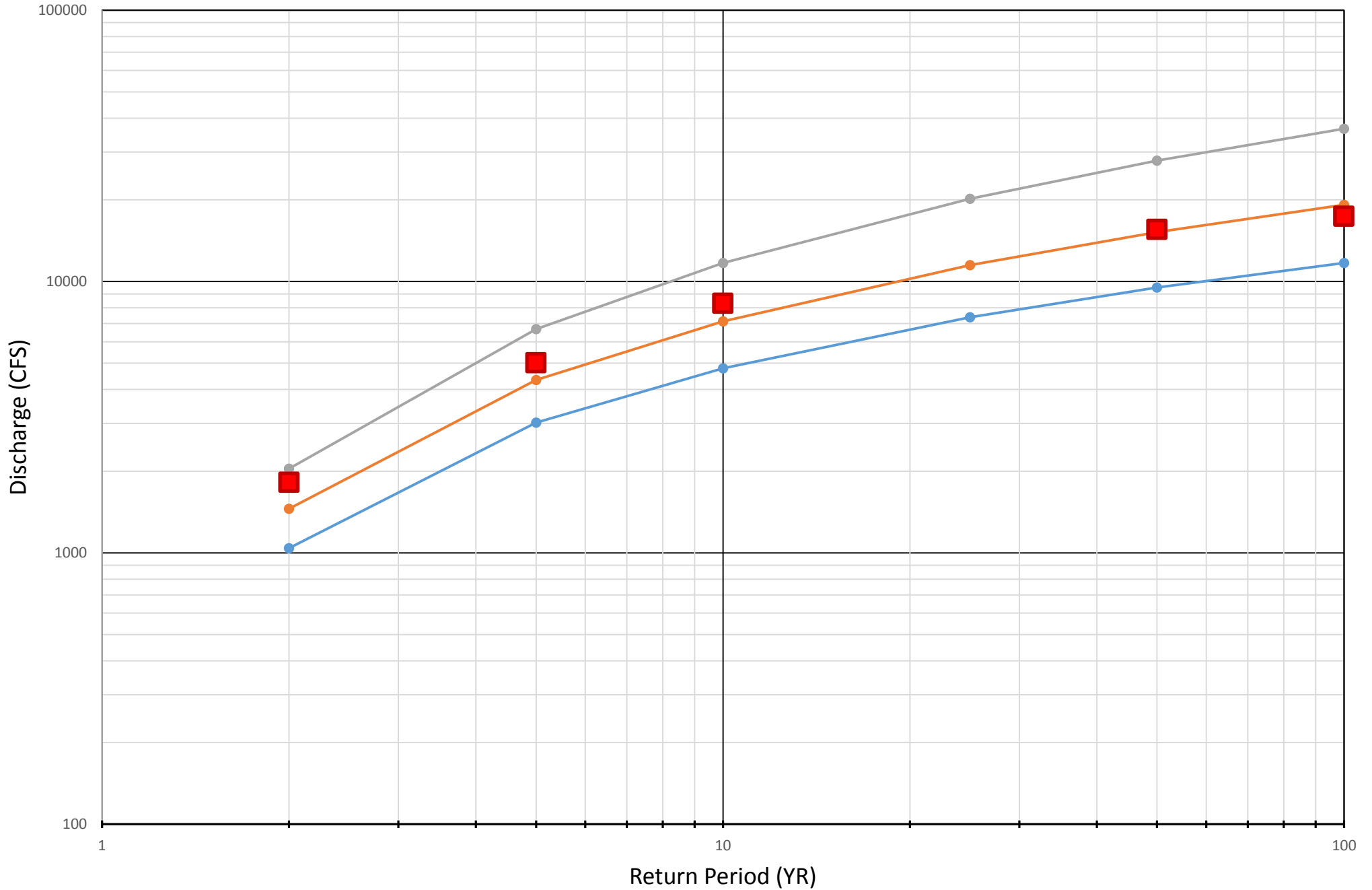
Arroyo Hondo near San Jose (11173200)

95% Low Bull 17B 95% Up Model



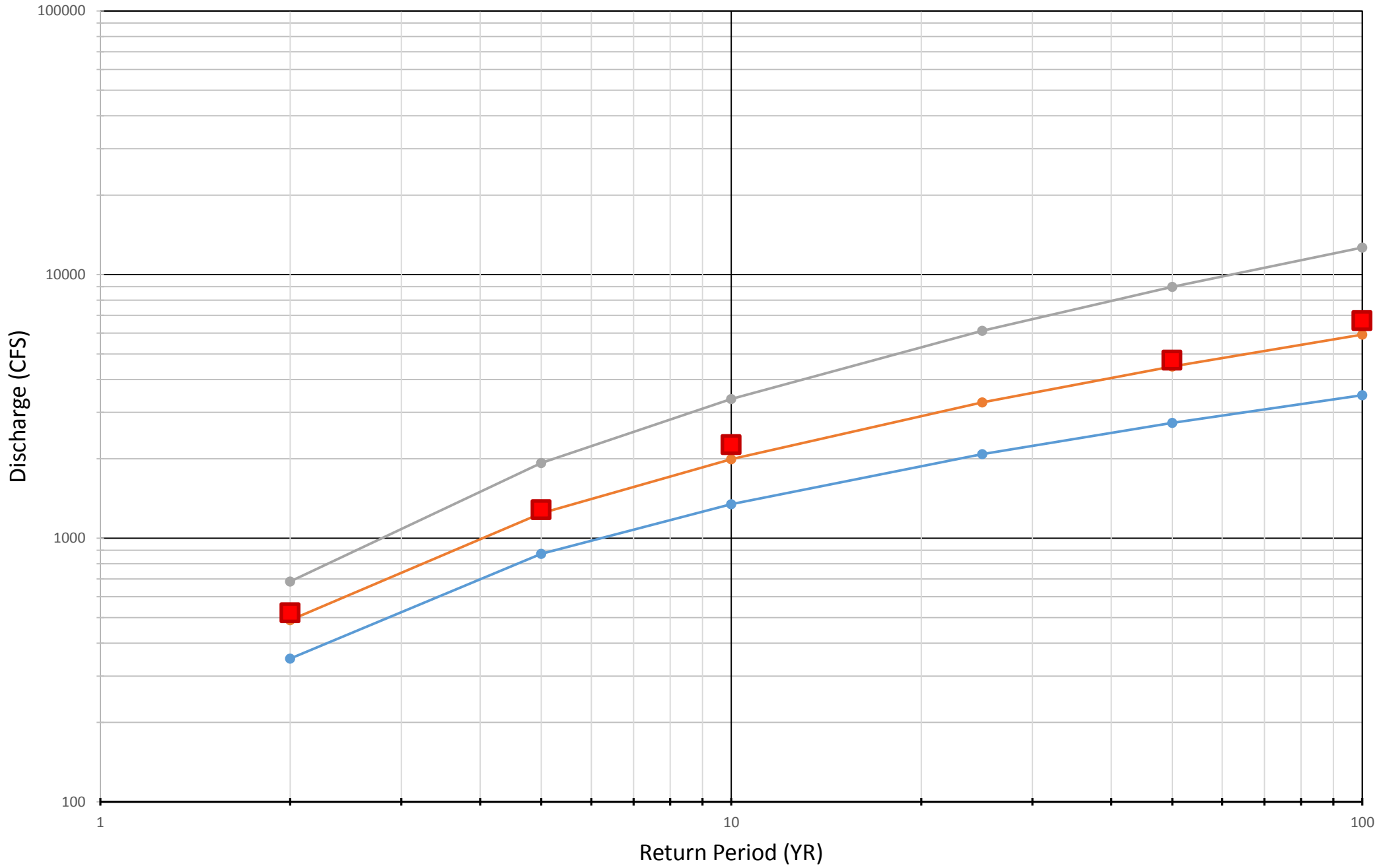
Arroyo Valle below Lang Canyon near Livermore (11176400)

95% Low Bull 17B 95% Up Model



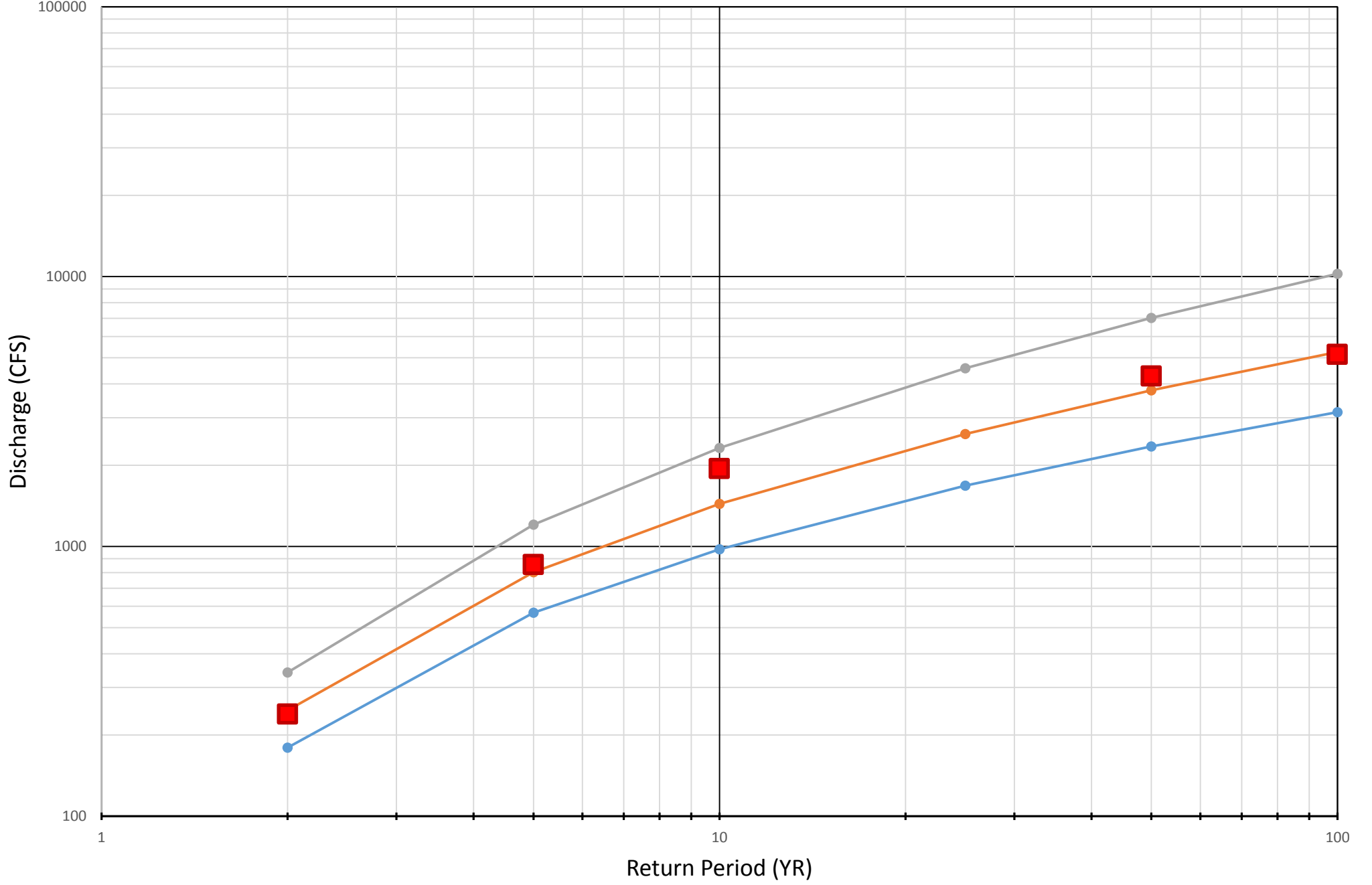
Arroyo las Positas near Livermore (11176150)

95% Low Bull 17B 95% Up Model



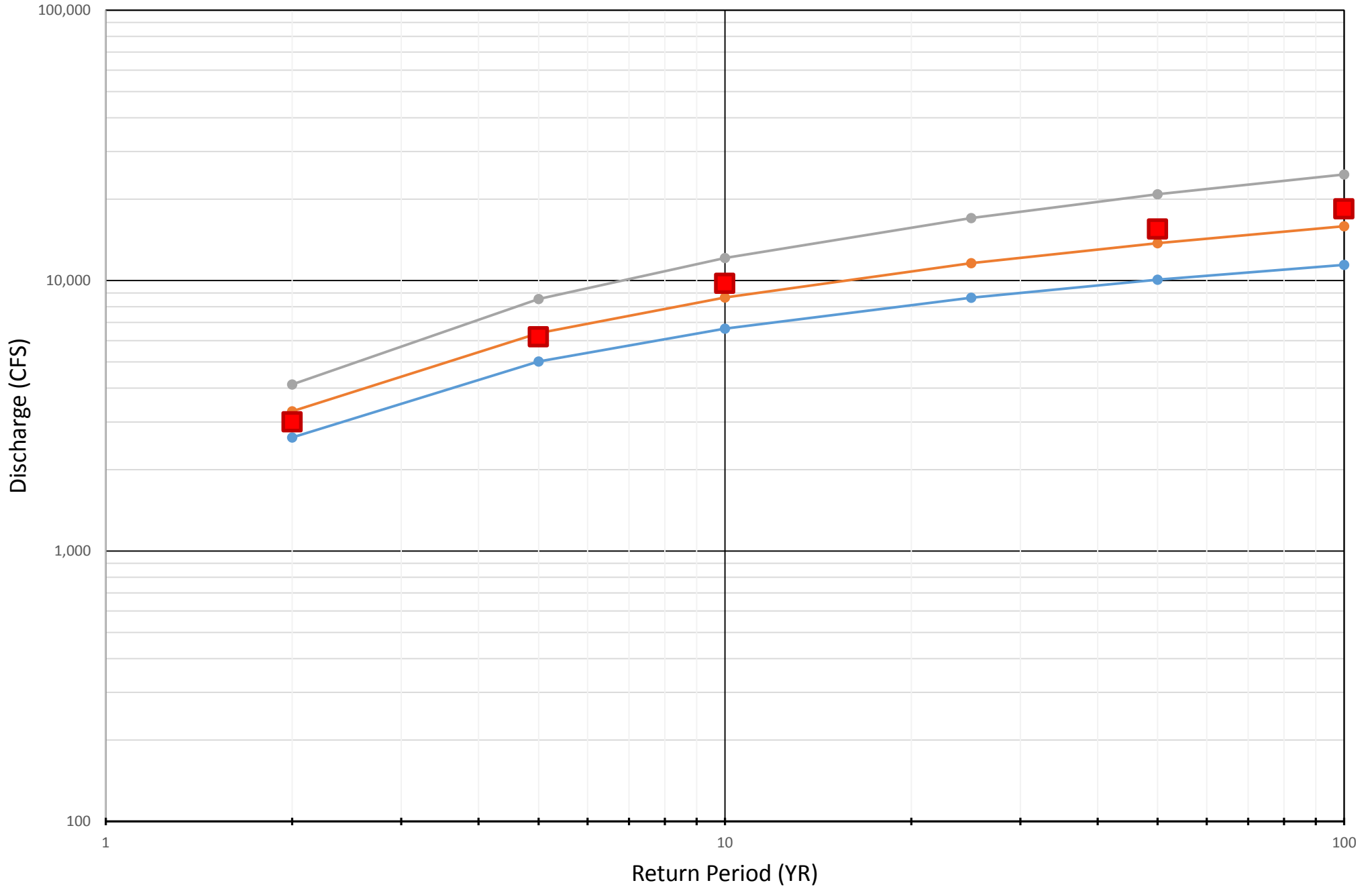
Arroyo Mocho near Livermore (11176000)

95% Low Bull 17B 95% Up Model



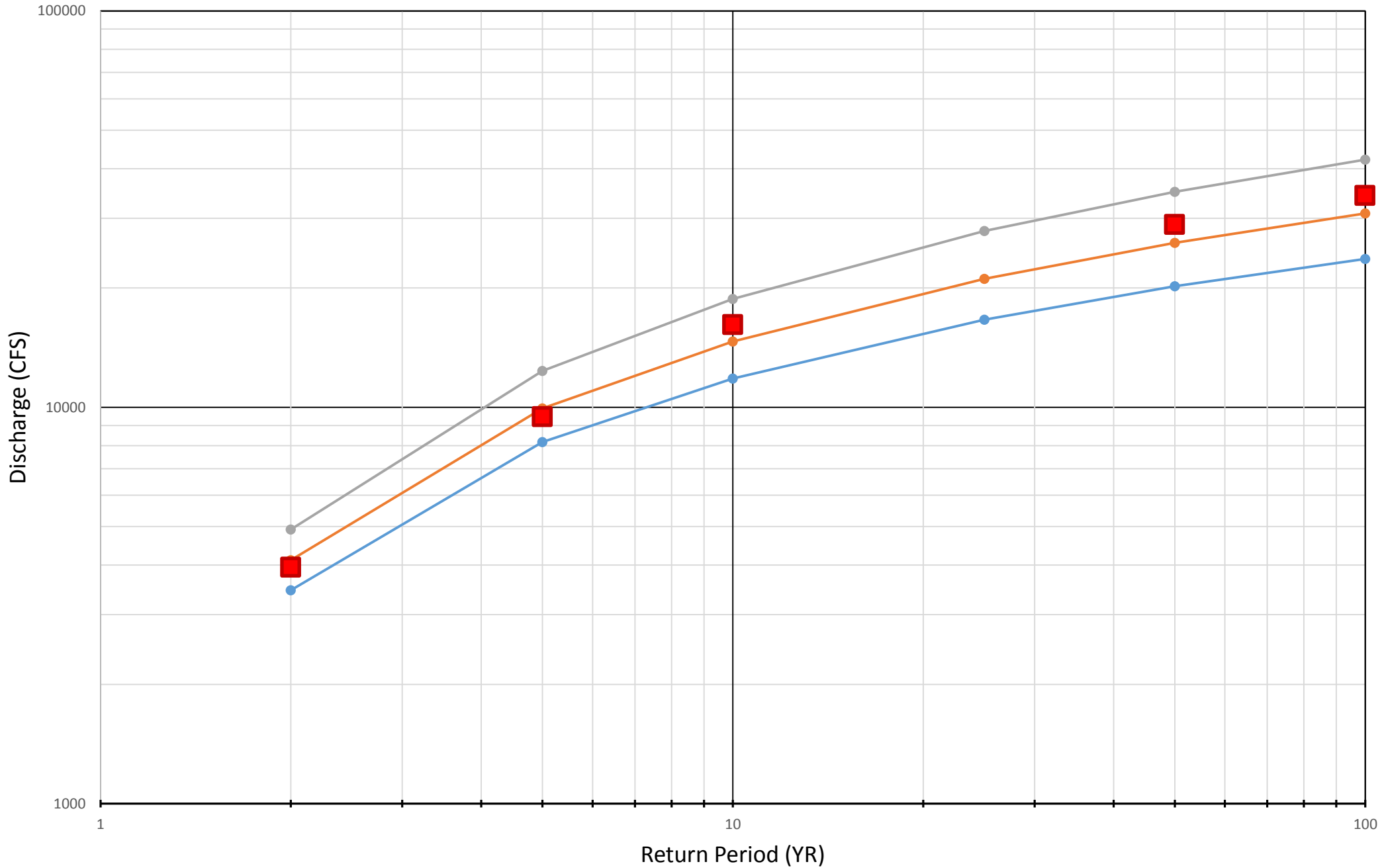
Arroyo de la Laguna at Verona (11176900)

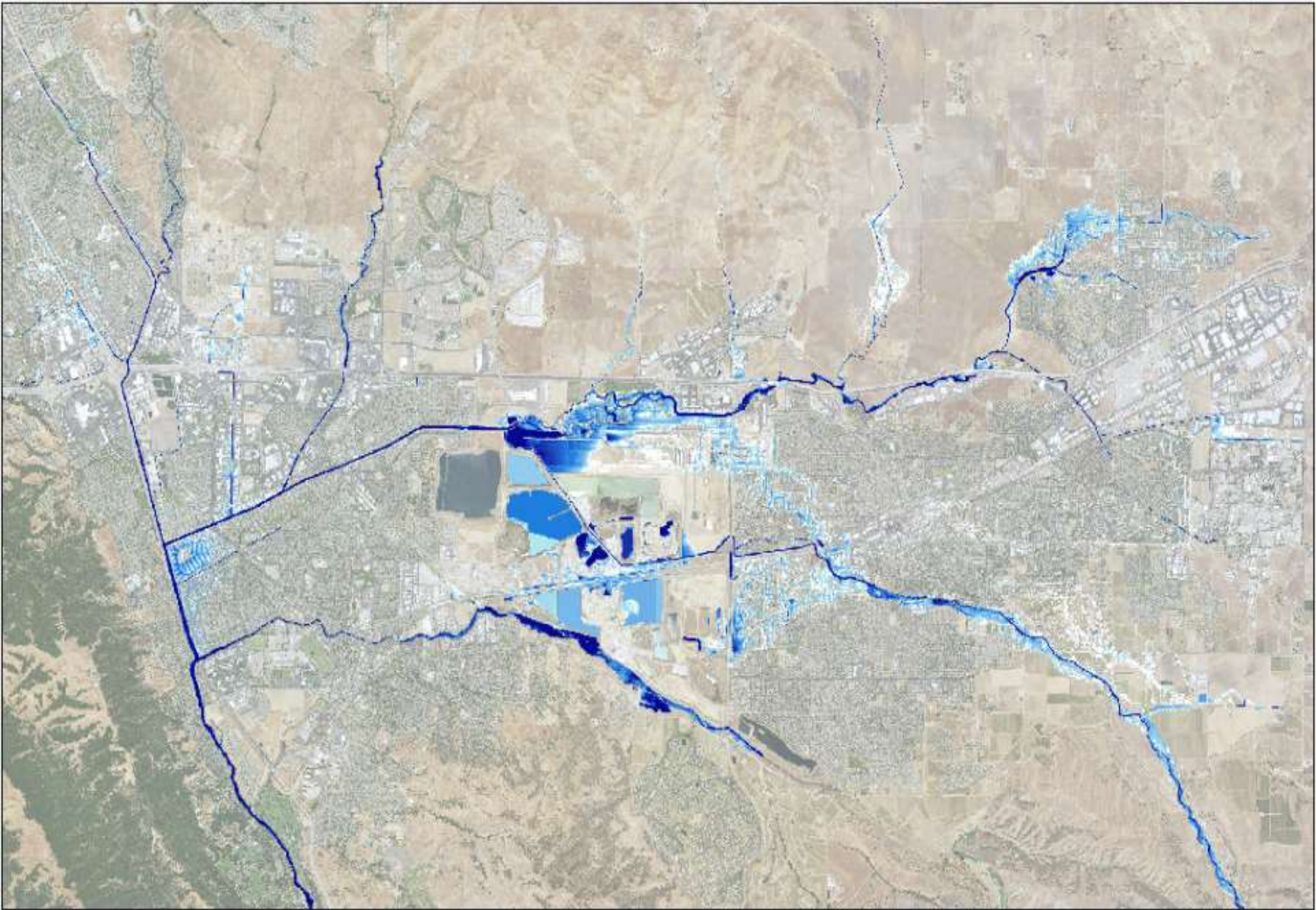
95% Low Bull 17B 95% Up Model



Alameda Creek at Niles (11179000)

● 95% Low ● Bull 17B ● 95% Up ■ Model





Thank you.

