

# Technical Memorandum

**To:** Chris Krivanec, PE, GE, HDR Engineering  
**From:** Ray Costa, PE, GE  
**Reviewed By:** Gale Paddock, PE  
**Date:** 23 February 2007  
**Re:** Recommendations for Detention Basin Construction, Yuba River Left Bank Levee

## INTRODUCTION

This memorandum presents recommendations for design of the relocated Caltrans detention basin adjacent to (south) of the constructed seepage berm along the Yuba River left bank levee upstream from State Highway 70. The existing basin was relocated due to location conflicts with the new seepage berm. Of concern was the potential discharge of excess seepage (boils) in the bottom of the unlined basin.

## TOPOGRAPHY AND WATER SURFACE ELEVATIONS

Topography used in our evaluation was performed by the United States Army Corps of Engineers (USACE) and provided to us by MBK Engineers (MBK). It is our understanding the datum for this survey was the National Geodetic Vertical Datum of 1929 (NGVD29).

Water surface elevations were taken from a graph provided to us by MBK entitled *Yuba River Basin LRR, Design Water Surfaces, Yuba River Left Bank* dated February 27, 2004. It is our understanding the datum for these elevations is NGVD29. The two elevations used in our analyses were the "100-year" elevation of approximately 73 feet, and the "1/AEP=200" (200-year) elevation of approximately 78 feet where AEP is the Annual Exceedance Probability.

## SUMMARY OF SEEPAGE ANALYSIS Caltrans Detention Basin

Design Water Surface	Bottom of Basin Elevation	Water Surface in Basin	Average Gradient North Side	Average Gradient South Corner	Plate which Depicts Analysis
100-year	57	57	0.53	0.49	D-1
200-year	57	57	0.68	0.62	D-2
100-year	57	59	0.44	0.40	D-5
200-year	57	59	0.59	0.54	D-6

The seepage analysis of the detention basin constructed at the Caltrans maintenance yard evaluated both the 100-year and 200-year Yuba River elevations. This analysis also investigated the gradients with the basin empty (Water Surface in Basin at 57 feet) and with water in the basin (Water Surface in Basin at 59 feet).

All hydraulic gradients are below 0.8 which is the criteria followed for exit gradients at the toe of a seepage berm.

In addition, should a boil develop in the basin, the edge of the basin is about 50 feet from the seepage berm toe. Should it be necessary, relief wells can be installed within this setback area to reduce the seepage gradient within the basin. We recommend this area be closely monitored during the first few intervals of elevated river stage conditions.