

# TECHNICAL MEMORANDUM

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**To:** Pauline Block  
**Company:** CPSA Old Redwood Hwy, LLC  
**Date:** 5/29/2024  
**From:** David S. Smith, PE, CFM, BC.WRE  
**Subject:** Adobe Lumber Fill Evaluation

## Background

This technical memorandum describes the changes in the 10- and 100-year floodplain depths (increases and decreases) that would occur when removing approximately 11,500 cubic yards of fill at 5600 Old Redwood Highway North. The City of Petaluma (City) HEC-RAS 2D model v6.3.1 is the basis of this evaluation.

## 2D Hydraulic Model Edits

Model parameters such as Manning's  $n$  values, mesh extents and cell sizes, unsteady flows, and boundary conditions were not modified for this evaluation. The 24- hour 10-year and 100-year storm events were used to evaluate the difference in flood depths, as both storms result in Willow Brook breakout flows towards the subject property.

The original topographic data is a DEM compilation that includes the County Veg Map topography with modifications to represent a bare earth terrain surface. This terrain was copied and the fill at 5600 Old Redwood Highway North was removed in the RAS Mapper utility using the terrain modification tool. The modification lowered the terrain to match the surrounding grade (see Figure 1). The volume of fill removed was calculated using the geographic information system (GIS [ArcMap10.5.1]) program as 11,690 cubic yards which is about 4.3 feet.

## Results

A comparison of 100-year depth results for modified terrain (with fill removal) conditions versus the existing terrain conditions is provided in Exhibit 1. The difference values are calculated as modified minus existing, so positive values (red) occur when depths with fill removal are greater than the original condition, and the negative values (green) occur when depths with fill removal are less than the original condition. The amount of depth reduction considered to be "significant" was selected as 0.01 feet, which is the standard used by FEMA in mapping determinations. Exhibit 1 values shaded either red or green are greater than 0.01 feet. The additional depth zones shown (0.01 – 0.05, 0.05 – 0.25, etc.) were included to illustrate how

the depth differences vary spatially. In addition, the depth difference values at affected buildings are included as a positive or negative number to each affected building (positive corresponds to red or increase, and negative corresponds to green or decrease). The color white in Exhibit 1 indicates areas of no change.

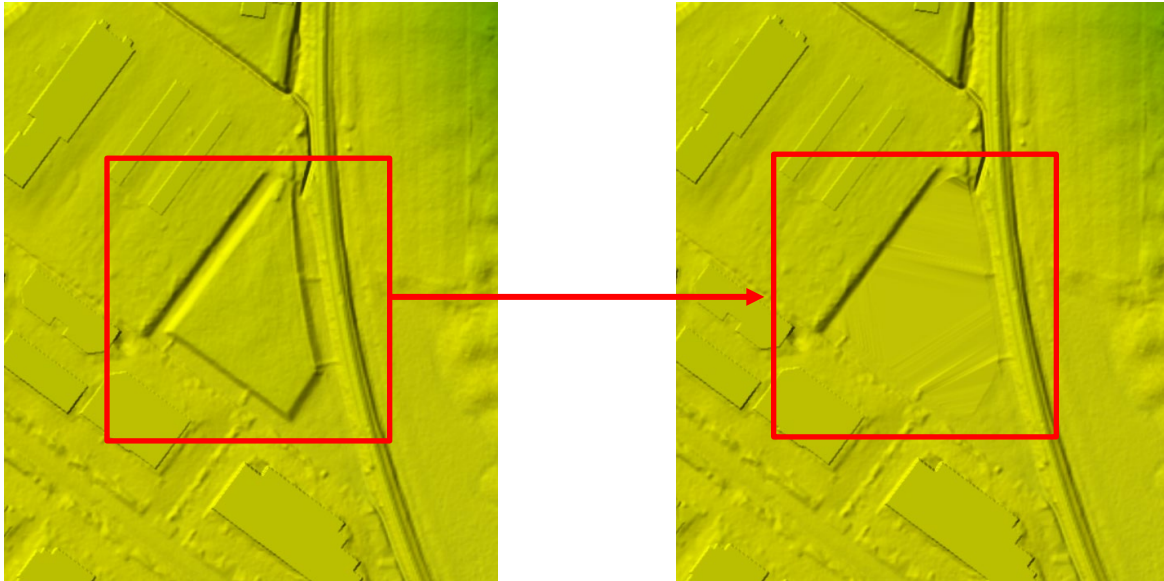


Figure 1: Existing terrain (left) and modified terrain with fill removal (right).

## Conclusions

The modified terrain (with fill removal) results in slightly less flow breaking out upstream of Old Redwood Highway, and therefore more flow remaining in Willow Brook. The increased depth in the Benson property (near the top of Exhibit 1, north of Willow Brook) is the result of less flow breaking out near Adobe Lumber. There is one building adjacent to the fill removal that benefits more than any others, with a 100-year flow depth decrease of about 0.5 feet. Most other areas of increase and decrease are within the 0.01 to 0.05 range. However, the 100-year depth reductions (green) do not appear to be significant enough to justify the depth increases (red). Therefore, the fill removal is not recommended.



