

Attachment - Bridge Scour Study Scope

Purpose and scope of the study: Hydraulic & Hydrology & Sediment Transport modeling of a reach of Sweetwater River between Loveland Reservoir and Sweetwater Reservoir to study bridge piers' long-term degradation and scour potential in the current condition and after future development (with and without Cottonwood Sand Mining Facility).

1- Hydrology: Obtain 100-year flood from the owner of Loveland Dam. Delineate watersheds which contribute to Larson Creek and Sweetwater River downstream of the dam. Obtain the rainfall from NOAA Atlas 14, hydrologic soil type from USDA website, land cover from USGS and find the flow rate in the river with an appropriate hydrologic model: HEC-HMS, WMS, or SWMM (or SWMM's commercial versions). Please be careful about the limitation of the method you select considering the extent of the region (max size of watershed in SCS method, and hydrologic reductions applicable to rainfalls in large regions).

2- Hydraulic: Obtain a high-resolution DEM of the area (not coarser than 2m by m) and build a 2D hydraulic model in HEC-Ras or SRH-2D. Then use the above-mentioned inflows from part 1 (hydrology) as boundary/initial conditions. Please generate the mesh such the streambed for 10-year flow has at least 5 transverse cells in each cross-section (in the mining zone and bridges' vicinity). You may use a 1D-2D model if you wish, but do not select the 1D cross-sections farther than 100 ft and use a 2D model in the vicinity of the mining site and bridges.

3- Sediment and Scour: Use the results of part 2 (Hydraulic) to calculate pier scour and long-term degradation. In this stage assume, the tailwater come out of upstream dam is "clear water", and loose streambed materials with a size distribution from sample sieve analysis. Use methods of HEC-18 for this analysis (HEC-18: Evaluating Scour at Bridges, Fifth Edition by FHWA). You may use SRH-2D linked to Hydraulic Toolbox, or manually enter HEC-Ras results into Hydraulic Toolbox (please note, HEC-Ras embedded bridge scour formula does NOT use the current version of HEC-18 manual for bridge scour calculation). Caltrans will provide bridge plans (and other needed information) for this study.

Please explicitly document any parameter/value assumption in your study and submit them with the final report. You are welcome to request information or discuss upcoming issues in this project with Caltrans Hydraulic Group. You must submit your models with the report. For further questions and inquiries please contact Kevin Flora (kevin.flora@dot.ca.gov) or Jimmie Pallares (jimmie.pallares@dot.ca.gov) or Kaveh Zamani (kaveh.zamani@dot.ca.gov).