



## **Indefinite Delivery Type Architect-Engineering Contract for Hydraulic, Hydrologic, and Sedimentation Engineering Studies**

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**Eastern Arkansas Water Supply Study** - Study included extensive model application and model calibration to analyze the effect of in-basin water transfers on surface water flow magnitude, frequency, and duration in the La Grue Bayou stream network using Corps of Engineers' programs HEC-1, HEC-2, HEC-DSS, and HEC-FFA. A unique feature to this study was the application of the Memphis District's program HUXRAIN to develop long term (50 years) synthetic discharge hydrographs using calibrated antecedent precipitation index coefficients, a long term rainfall data base, and computed unit hydrographs for the sub-basins. Another component of this work was an interior hydrology study for the city of Clarendon, Arkansas. Several scenarios were analyzed using HEC-IFH for continuous simulation with 50 years of data.

**West Tennessee Tributaries Project Limited Evaluation Study** - A reconnaissance level analysis was conducted to evaluate the proposed restoration of old river meanders that were cut off from the Middle Fork Forked Deer River by historical channelization projects. This study included an extensive combination of hydrological, hydraulic, and sediment transport simulations, using historical rainfall and runoff records, current field data, and calibration to 1960 and 1979 channel geometry survey data. In addition to Corps of Engineers' programs HEC-1, HEC-2, HEC-DSS, HEC-FFA, and HUXRAIN for surface water flow modeling and standard computer program HEC-6 for sediment transport analysis, the newer HEC-6T, "Sedimentation in Stream Networks", developed by William A. (Tony) Thomas, was used to evaluate the sediment transport of flow converging and diverging at the junctions of the main channel and the old meanders. A sediment-weighted histogram generator modified by WEST Consultants was used to generate the hydrology input for the HEC-6 programs. Designs for rock riprap diversion weirs and bridge protection, and an in-line sediment trap were developed in this study.

**Wolf River Reconnaissance Study** - Included a hydraulic and sedimentation analysis for approximately 75 miles of the Wolf River in western Tennessee. An HEC-2 model for the lower reaches was extended with new survey data into the upper watershed. A HEC-6 model was then developed to evaluate the effect of grade stabilization weirs, environmental enhancement weirs with permanent pools, and reductions in inflowing sediment loads from 9 tributaries in the upper watershed. HEC-1 was used to compute unit hydrographs for calibration to stream gage data. The sediment-weighted histogram generator program was used to construct the HEC-6 input hydrology. The results of a 25-year future simulation were evaluated in terms of vertical bed elevation changes over time and volumetric changes in sediment deposited and scoured on a reach by reach basis.

**White River Unsteady Flow Model** - An unsteady flow model using the computer program UNET was developed for 70 miles of the White River in eastern Arkansas. Model parameters were calibrated to historical stage and flow records before executing two 47 year simulations. Simulations were run for existing conditions and conditions after installation of an inlet canal and pumping station for an irrigation scheme. Results were provided to the District to help them evaluate effects of the irrigation project on the river. A second part of this project involved evaluation of the irrigation canals for sediment transport and scour/deposition. The computer program SAM was used to help determine stable channel parameters and the amount of scour/deposition that could be expected with the District's design geometry and slope.

**Project Owner:**

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**Completion Date:**

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