



International Wastewater Treatment Plant Streambank Protection

Purpose: WEST Consultants, Inc. (WEST) was retained as a subconsultant to Malcolm Pirnie, Inc. (MPI) to conduct a hydraulic, scour and erosion study for the International Boundary and Water Commission, United States Section (IBWC). The IBWC is preparing construction plans for the South Bay International Wastewater Treatment Plant, which will be located in the City of San Diego near the International Border. The plant will be constructed on embankment fill within the floodplain of the Tijuana River. The IBWC has proposed to protect the site with an armored levee that ties into the existing levee connected to the United States Flood Control Project concrete energy dissipator structure. The IBWC has selected the Standard Project Flood (SPF) as the design event. The SPF in the Tijuana River is 135,000 cfs and represents a 335-year frequency flood. The purpose of this study is to provide design recommendations for the erosion protection for the treatment plant site and to provide water surface elevations for the SPF based on 1993 topography in order to evaluate the proposed height of the levees and resulting freeboard.

Scope: The scope of work for WEST in this study includes developing a new HEC-2 hydraulic model of the Tijuana River at the project site. The new model is based on 1993 aerial topography maps, recent field surveys, and field reconnaissance. The model is prepared in sufficient detail in order to be suitable for use in the FEMA letter of map revision process for the 100-year flood. From the hydraulic model, design parameters for scour analysis and erosion protection design were obtained for the Standard Project Flood. Recommendations are given for rock riprap bank protection and a levee spur extension to protect the downstream end of the 1st (Emergency) Module of the treatment plant site.

Recommendations: For bank protection at the treatment plant site, WEST recommended a rock riprap blanket rather than gabion baskets. Both the initial cost and future maintenance costs will be lower with a rock riprap revetment. The design discharge in this case is the Standard Project Flood (135,000 cfs), which is about twice the magnitude of the FEMA 100-year flood (75,000 cfs). The labor costs for a gabion installation, with the requirement for hand placement of rock and tying of baskets, would be considerable. It is known that sewage spills frequently travel down the Tijuana River from Mexico. This may make the water acidic or corrosive and weaken the baskets. Also, moderate floods, such as those of 1980, 1983, and 1993, carry large amounts of debris. Therefore, a high potential for damage to the wire baskets exists. Repair to rock riprap revetment generally is less labor intensive, and may only require moving or replacing materials.