FY 23 ENVIRONMENTAL PROGRAM SUPPORT TMDL FOR SLD 45

PROJECT DESCRIPTION

AEI provided environmental services in support of a multi-purpose water resources Civil Works project for the Space Launch Delta 45 (SLD 45) at PSFB and CCSFS installations and MTA. To comply with Total Maximum Daily Loads (TMDLs) mandated by the Florida Department of Environmental Protection (FDEP) and the Florida Clean Waterways Acts (FCWA), AEI conducted comprehensive watershed evaluations via compliance monitoring, reporting, and development and implementation of structural and nonstructural Best Management Practices (BMPs).

Coastal Ecosystem Restoration Feasibility Study and Design. AEI performed comprehensive engineering services to include a feasibility study and shoreline erosion protection (living shoreline) design to stabilize the entire PSFB FamCamp shoreline that integrates into existing mangroves while considering the needs for new construction. We prepared the wetland permit applications for USACE and St Johns River Water Management District to include the supporting documentation of the extent of wetlands and waters of the U.S. and State, Uniform Mitigation Assessment Method functional assessment of wetlands present on-site, and potential for special-status species to occur. The team had to quickly adapt to the stricter water quality goals established by the recently passed FCWA and Stormwater Rule while also addressing the needs for SLD 45 to reverse the coastal erosion from recent storm damage, restore the ecosystem habitat and mitigate future storm damage impacts. To meet these challenges, AEI provided strategic planning to prepare the Government for new regulatory hurdles, prioritize cost-effective BMPs, and recommend innovative standard operating procedures that would allow SLD 45 to achieve multiple missions

Comprehensive Watershed Evaluations. AEI provided comprehensive engineering services and technical support by reviewing recently completed, ongoing, and planned engineering designs and construction projects for PSFB, CCSFS, and MTA to assess stormwater and watershed impacts, identify potential TMDL credits, and identify opportunities to develop cost effective structural/non-structural BMPs jointly with applicable stakeholders.

PROJECT DETAILS

PROJECT CLIENT:

U.S. Army Corps of Engineers (USACE), Mobile District for U.S. Space Force (USSF) Space Launch Delta 45 (SLD 45)

PROJECT LOCATION:

Patrick Space Force Base (PSFB), Cape Canaveral Space Force Station (CCSFS), Malabar Transmitter Annex (MTA), FL

SERVICE LINE AREAS:

- Civil Works & Engineering
- Water Resources Studies
- Environmental Compliance
- Natural Resources
- GIS & Remote Sensing

EXPERTISE:

- Comprehensive watershed evaluation
- Comprehensive engineering services
- Coastal ecosystem restoration
- Coastal hurricane & storm damage reduction
- Shoreline erosion protection
- Storm damage risk reduction
- Feasibility studies
- BMP Design
- Cost estimating
- Permit preparation
- GIS/CADD/BIM

FY23 ENVIRONMENTAL PROGRAM SUPPORT TMDL FOR SLD 45

PROJECT DESCRIPTION (CONT.)

Implementation of Comprehensive Watershed Evaluation Compliance Master Plan for the MTA. Implemented a comprehensive watershed evaluation monitoring plan to measure MTA's existing impact on the Melbourne Tillman C-1 Drainage Canal and potential watershed impacts based on future development plans on the property. Identified the location and inverts of selected structures and associated discharge elevations, and measured flow and water levels for the MTA internal canal to understand typical discharge volumes. Flow-weighted samples of representative dry and wet season samples, with significant discharge, were collected and analyzed to understand the stormwater nutrient impact on the C-1 canal.

Hydrology and Hydraulic (H&H) Analysis including 2D & 3D Stormwater Modeling. AEI developed a sampling and analysis plan (SAP) to collect flow, volume, and associated water quality data upstream/downstream of a proposed structural BMP (i.e., a weir) to be constructed at CCSFS. Utilizing the USGS-based Hydrograph Analysis Tool to separate the baseflow component in varying 'streamflow' hydrographs AEI compared the data to previous H&H (ICPR, now Stormwise) model outputs to validate preconstruction information and developed a baseline for post-construction conceptual model data to determine the potential load reduction efficiency, using BMPTrains, and associated TMDL credits.

Feasibility Studies for Stormwater BMPs at the PSFB Golf Course and Runway Canal. AEI identified structural and nonstructural BMPs and assessed their projected performance, cost, and effectiveness to minimize pollutants from entering the stormwater system, reduce the stormwater volume and nutrient loads and meet TMDL reductions mandated by the FDEP. We provided details on potential BMP sizing, media types, designs, and an assessment of performance through a combination of statistical assessments of the International BMP database and unit processes, local performance information, and watershed modeling. The team also provided estimates of nutrient pollutant reduction values using BMPTRAINS (a civil engineering water resources software), conceptual construction cost estimate, and a description of the potential O&M activities and estimated O&M costs for each BMP. Lastly, water quality and sediment sampling were performed to better guide BMP development.

Canal Assessment. AEI developed the first Canal Assessment Management planning document for PSFB to inventory and assess the condition of the installations drainage canal system and provide economically feasible implementation strategies (e.g., worst first) to improve water quality and meet TMDL compliance. The plan addressed affordability and equity issues, reflected stakeholder concerns, and satisfied environmental and regulatory criteria. AEI created a GIS inventory of the canal system and conducted field surveys to assess the condition of the system and collect water quality, sediment, and biological data to develop a water quality ranking system for the canals and recommend cost-effective structural and non-structural BMPs (with estimated costs) to improve water quality and minimize pollutants from entering the watershed.

Shoreline Erosion Protection BMP Implementation. AEI evaluated the existing shoreline erosion protection BMP by assessing initial sampling protocols, identifying critical changes required in the protocol and obtained FDEP approval to implement changes, and developed a SAP based on the new protocols to demonstrate the effectiveness of the BMP on nutrient reductions to the watershed.