



**US Army Corps
of Engineers** ®
Los Angeles District



**SANTA ANA RIVER 2
LEVEE SYSTEM
ORANGE COUNTY, CALIFORNIA
NLD SYSTEM ID # 3805010014**

**PERIODIC INSPECTION REPORT NO 1
GENERALIZED EXECUTIVE SUMMARY**

**FINAL SYSTEM RATING: MINIMALLY ACCEPTABLE
FINAL RATING DATE: SEPTEMBER 26, 2013**

PERIODIC INSPECTION REPORT PREPARED BY TETRA TECH
FOR THE U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

SUBMITTED: SEPTEMBER 2013
INSPECTED: JUNE 18, 2013

EXECUTIVE SUMMARY

This Executive Summary provides an introduction to the periodic inspection, an overview of the Santa Ana River 2 (SAR2) Levee System, a summary of the major findings of the periodic inspection of the SAR2 Levee System, and the Overall Levee System Rating.

1.1 Scope and Purpose of Periodic Inspections

The purpose of the SAR2 Levee System periodic inspection is to identify deficiencies that pose hazards to human life or property. The inspection is intended to identify the issues in order to facilitate future studies and associated repairs, as appropriate.

This assessment of the general condition of the SAR2 Levee System is based on available data and visual inspections. Detailed investigation and analysis involving hydrologic design, topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of this SAR2 Levee System periodic inspection.

1.2 System Summary

The SAR2 Levee System is located on the left/east bank of the Santa Ana River in the state of California, in Orange County, in the cities of Costa Mesa and Newport Beach (Figure 1). The SAR2 Levee System was federally authorized and subsequently constructed by the U.S. Army Corps of Engineers, Los Angeles District (USACE LAD). Construction of the SAR2 Levee System was completed in September 1992 (USACE LAD 1996). The SAR2 Levee System is now entirely operated and maintained by Orange County Flood Control District (OCFCD), which is administered by Orange County Public Works (OCPW) staff. OCPW staff were present at the periodic inspection. The National Levee Database Number (NLD No.) for the SAR2 Levee System is 3805010014. The SAR2 Levee System is composed of three levee segments: (1) the Santa Ana River 2a Levee Segment (i.e., the SAR2a Levee Segment); (2) the Santa Ana River 2b Levee Segment (i.e., the SAR2b Levee Segment); and (3) the Greenville-Banning Levee Segment (i.e., the GB Levee Segment). It should be noted that the SAR2 Levee System is currently in the NLD as one system/segment. It is recommended that the NLD be updated with the three levee segments (i.e. SAR2a Levee Segment, SAR2b Levee Segment, and Greenville-Banning Levee Segment). The SAR2 Levee System has an earthen embankment, concrete or riprap lined riverward side slopes, concrete lined or natural invert, seven side-drainage structures, two tide-gate assemblies, three side-drain junction structures, numerous utility crossings, one bridge crossing, and one access ramp.

The SAR2a Levee Segment forms the left/east bank of the Santa Ana River, and extends from immediately downstream of the confluence of the Santa Ana River with the Greenville-Banning Channel (Station 76+40) to immediately downstream of the Pacific Coast Highway (Station 13+40), a distance of 6,300 feet.

The SAR2b Levee Segment forms the left/east bank of the Santa Ana River, and extends from immediately downstream of Victoria Street/Hamilton Avenue (Station 90+40) to immediately upstream of the confluence of the Santa Ana River with the Greenville-Banning Channel (Station 76+40), a distance of 1,400 feet. The SAR2b Levee Segment also forms the right/west bank of the Greenville-Banning Channel and extends from immediately downstream of Victoria Street/Hamilton Avenue (Greenville-Banning Station [GB Station] 24+10) to immediately upstream of the confluence of the Santa Ana River with Greenville-Banning Channel (GB Station 9+50), a distance of 1,460 feet.

The GB Levee Segment forms the left/east bank of the Greenville-Banning Channel, and extends from immediately downstream of Victoria Street/Hamilton Avenue (GB Station 24+10) to immediately upstream of the confluence of the Santa Ana River with the Greenville-Banning Channel (GB Station 9+50), a distance of 1,460 feet.

1.3 Summary of Major Deficiencies Found

The periodic inspection of the SAR2 Levee System was conducted on June 18, 2013 and OCPW staff were present. OCPW refers to the levee system as Reach 1. During the inspection of the levee system, deficiencies were noted for which remedial actions are required. The following main deficiencies of the project features were noted during the periodic inspection:

- **Levee Embankment:**

- GB Levee Segment: Significant vegetation growth (brush, tall grass, and trees with trunks greater than 2 inches in diameter) was present within the vegetation-free zone on the landward slope of the levee embankment. The vegetation-free zone extends 15 feet outward from both the landward and riverward toes of a levee. The vegetation was planted as part of the USACE LAD Esthetic Treatment and Erosion Control Plan (USACE LAD 1993).
- SAR2a Levee Segment: Numerous animal burrows were observed on the landward slope. The existing animal-control program that is in place needs to be improved and properly implemented. The levee damage due to the rodent burrows observed during the periodic inspection has been evaluated by OCPW (OCPW 2013c) since the periodic inspection, and repair work is planned.
- SAR2a Levee Segment: Riprap was missing from a 30-foot by 30-foot square area on the riverward slope at the interface with the concrete slope paving.
- SAR2a Levee Segment: There was a hole in the grouted riprap on the riverward slope measuring 7 feet long by 3 feet wide by 2 feet deep.

- **Interior Drainage System:**

- SAR2a Levee Segment and GB Levee Segment: Trash Racks were missing from the inlet of three 36-inch-diameter RCP side-drainage structures located along the SAR2a Levee Segment and missing from the inlet of the 24-inch-diameter RCP side-drain junction structure along the GB Levee Segment.
- GB Levee-Segment: The inlet of the 12-inch-diameter RCP side-drain junction structure is half full with sand.
- GB Levee-Segment: Active erosion and scouring toward the base of the structure were observed along the GB Levee Segment at the inlet of the 24-inch-diameter RCP side-drain junction structure.
- GB Levee-Segment: Video inspection of the interior of the 24-inch-diameter RCP side-drain junction structure revealed multiple fractures in the soffit of the pipe located near the outlet.

1.4 Overall Rating

The Levee Safety Out-Brief Meeting was held on September 11, 2013. An engineering determination has concluded that the observed deficiencies would not prevent the system from performing as intended during the next flood event. Therefore, the Levee Safety Officer (LSO), Los Angeles District, has determined the overall system rating to be “Minimally Acceptable.”

A “Minimally Acceptable” system rating is defined as, “One or more items are rated Minimally Acceptable or one or more items are rated Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment/system from performing as intended during the next significant runoff event.”

The Local Sponsor will be notified of the overall rating of the levee system by letter with instructions to correct the “Unacceptable” rated items as soon as possible, not to exceed two years, and to correct the “Minimally Acceptable” rated items so that they do not deteriorate further and become “Unacceptable.”

SANTA ANA RIVER 2 LEVEE SYSTEM
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Figure 1: Santa Ana River 2 Levee System