



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



**LOS ANGELES RIVER/
COMPTON CREEK 2 LEVEE SYSTEM
LOS ANGELES COUNTY, CALIFORNIA
NLD SYSTEM ID # 3805010033**

**PERIODIC INSPECTION REPORT NO. 2
GENERALIZED EXECUTIVE SUMMARY**

**FINAL SYSTEM RATING: UNACCEPTABLE
FINAL RATING DATE: MARCH 5, 2018**

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

SUBMITTED: JULY 2017
INSPECTED: AUGUST 19 AND OCTOBER 11-14, 2016

EXECUTIVE SUMMARY

This Executive Summary provides an introduction to the Periodic Inspection, an overview of the Los Angeles River/Compton Creek 2 (LAR/CC2) Levee System, a summary of the major findings of the Periodic Inspection of the LAR/CC2 Levee System, and the overall rating for the LAR/CC2 Levee System.

1.1 Scope and Purpose of Periodic Inspections

The purpose of the LAR/CC2 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 LAR/CC2 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 levee system inspection.

This report is for the Periodic Inspection Number 2 (PI No. 2) of the LAR/CC2 Levee System. The PI No. 1 of the LAR/CC2 Levee System was conducted by URS Group, Inc. (URS) on behalf of the U.S. Army Corps of Engineers, South Pacific Division, Los Angeles District (USACE SPL) in 2010.

1.2 System Summary

The LAR/CC2 Levee System is located in Los Angeles County, California, and is part of the Los Angeles County Drainage Area (LACDA). It is composed of three levee segments (Figure 1) along the west/right bank of the Los Angeles River and the north/left bank of Compton Creek:

- Los Angeles River LAR/CC2a Levee Segment
- Los Angeles River LAR/CC2b Levee Segment
- Compton Creek LAR/CC2 Levee Segment

The upstream limit of the LAR/CC2 Levee System is at the upstream end of the LAR/CC2a Levee Segment, near Bandini Boulevard in the city of Vernon. The downstream limit of the LAR/CC2 Levee System is at the downstream end of the Compton Creek LAR/CC2 Levee Segment, near the Interstate 710 (I-710) in the city of Compton. The total distance of the LAR/CC2 Levee System is approximately 82,779 feet (15.68 miles). There are different types of infrastructure that lie within the leveed area, which include: residential, commercial, industrial, educational, transportation, and civic improvements. This area is located to the west and south of the Los Angeles River LAR/CC2a Levee Segment, west of the Los Angeles River LAR/CC2b Levee Segment, north of the Compton Creek LAR/CC2 Levee Segment, and is bordered on the west by the Union Pacific Railroad (UPRR) tracks parallel to Alameda Street.

The Los Angeles River LAR/CC2a Levee Segment is located on the right/west bank of the Los Angeles River from about 600 feet downstream of Bandini Boulevard to about 300 feet downstream of Southern Avenue. The levee segment is 31,860 feet (6.03 miles) in length, and is located in the State of California in Los Angeles County, in the cities of Vernon, Bell, and South Gate.

The Los Angeles River LAR/CC2b Levee Segment is located on the right/west bank of the Los Angeles River from the downstream end of the Los Angeles River LAR/CC2a Levee Segment, at

about 300 feet downstream of Southern Avenue, to the confluence of the Los Angeles River and Compton Creek. The levee segment is 38,852 feet (7.36 miles) in length, and is located in the State of California in Los Angeles County, in the cities of South Gate, Lynwood, Paramount, Compton, and Long Beach.

The Compton Creek LAR/CC2 Levee Segment is located on the left/east bank of Compton Creek from the UPRR tracks on the east side of the South Alameda Street embankment to the Compton Creek/Los Angeles River confluence. The levee segment is 12,067 feet (2.29 miles) in length and is located in the State of California in Los Angeles County, in the cities of Long Beach and Compton.

The LAR/CC2 Levee System consists of an earthen levee embankment and a trapezoidal channel with either reinforced-concrete, grouted stone, or asphalt slope paving and grouted stone on the riverward slope. The landward slope is covered by riprap, grouted stone, or is earthen and not covered by stone protection. Other features along the LAR/CC2 Levee System include floodwalls, retaining walls, 127 conduits associated with the side-drainage structures, two overflow weirs, eight pump stations, 27 bridge crossings, 12 access ramps, numerous utility crossings, landscaping, and irrigation.

This levee system, along with other similar works in the LACDA, was authorized initially by the Emergency Relief Act of 1935 to provide drainage and flood risk reduction. On June 30, 1937, this levee system was transferred to the more comprehensive project adopted in the Flood Control Act of June 22, 1936. Portions of the Los Angeles River channel were improved under the provisions of the Flood Control Act of 1941. The LACDA, California Flood Control Improvements project was authorized under Title I, Section 101(b) of the Water Resources Development Act of 1990 (Public Law 101-640) (USACE SPL 1999b). The National Levee Database Number (NLD No.) for the LAR/CC2 Levee System is 3805010033. The construction of the LAR/CC2 Levee System was completed in 1958 and subsequent improvements were completed circa 2001. The LAR/CC2a Levee Segment is operated and maintained by the USACE SPL. The Los Angeles River LAR/CC2b Levee Segment and Compton Creek LAR/CC2 Levee Segment are operated and maintained by the Los Angeles County Department of Public Works (LACDPW).

1.3 Summary of Major Deficiencies Found

The PI No. 2 of the LAR/CC2 Levee System was conducted on August 19, 2016 and October 11-14, 2016. USACE SPL staff were present during the inspection of the Los Angeles River LAR/CC2a Levee Segment. Los Angeles Department of Public Works staff were present during the inspection of the Los Angeles River LAR/CC2b Levee Segment and Compton Creek LAR/CC2 Levee Segment. During the inspection of the levee system, deficiencies were noted for which remedial actions are required. The following major deficiencies of the project features were noted during the PI No. 2.

1.3.1 Los Angeles River LAR/CC2a Levee Segment

- Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth, including shrubs and trees with trunks larger than 2 inches in diameter, were present on the riverward edge of the levee crown, landward edge of the levee crown, landward slope, and

- landward toe. In addition, there were intermittent tree stumps on the riverward edge of the levee crown, landward edge of the levee crown, and landward slope.
- Encroachments: There were encroachments that inhibited the ability to inspect the levee prism and are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the levee.
 - Depressions/Rutting: There were intermittent depressions near the top of the landward slope measuring up to 12 inches deep.
 - Revetments other than Riprap: The grouted stone on the riverward slope was damaged at multiple locations. The largest damaged area measured 20 feet long, 17 inches deep, and 6 feet wide.
 - Underseepage Relief Wells/Toe Drainage Systems: Intermittent subdrains along the toe of the riverward slope were obstructed by sediment. In addition, four subdrain vaults on the channel invert were missing manhole covers and vegetation was observed inside of these vaults. Per the USACE O&M Manual (USACE SPL 1999b), a test program is required every three years for the subdrain system; however, no maintenance records have been provided by the USACE SPL.
- Floodwalls:
- Non-Compliant Vegetation Growth: Tree stumps and trees with trunks larger than 2 inches in diameter were present within 15 feet of the landside face of the floodwall.
 - Encroachments: Two gaps/openings were observed along the floodwall, measuring up to 4 feet high and 8 feet long. As a result, the designed level of flood-risk reduction is not provided at these locations. In addition, equipment storage and several piles of steel railroad ties were encroaching on the landside of the levee.
 - Foundation of Concrete Structures: There were numerous animal burrows measuring up to 36 inches in depth on the landside base of the floodwall. The animal burrows appeared to extend underneath the floodwall. It should be noted that these animal burrows were included under the Floodwalls checklist, because they were located along a reach where there was only floodwall and no immediate landside levee embankment.
- Interior Drainage Systems:
- Vegetation and Obstructions: The outlet or inlet of five of the side-drainage structures were obstructed by more than 10 percent by vegetation, sediment, gravel, and/or debris.
 - Encroachments: The outlet of 17 of the side-drainage structures were abandoned and/or plugged with concrete. The abandonment of these side-drainage structures was not permitted by the USACE SPL.
 - Concrete Surfaces: Broken concrete, measuring up to 12 inches deep, was observed on the wingwall at the outlet of the 48-inch-diameter Reinforced Concrete Pipe (RCP) side-drainage structure.
 - Tilting, Sliding, or Settlement of Concrete Structures: Settlement measuring 2 inches deep was observed at the outlet of an abandoned 18-inch-diameter Corrugated Metal Pipe (CMP) side-drainage structure. In addition, a wingwall was displaced 6 inches laterally at the outlet of a 30-inch-diameter CMP side-drainage structure.
 - Monolith Joints: The outlet of 14 of the side-drainage structures had a gap measuring up to 3 inches wide at the interface of the grouted stone slope protection and concrete

outlet structure. Vegetation was observed growing in some of the joints around the side-drainage structures.

- Culverts/Discharge Pipes: All of the side-drainage structures could not be visually inspected, because either the flap gate at the outlet blocked access and/or the conduit was too small. In addition, video inspection records have not been provided by the USACE SPL.
- Flap Gates: A 48-inch-diameter RCP side-drainage structure and a 54-inch-diameter RCP side-drainage structure did not have flap gates and no documentation was available to show if a flap gate was required. In addition, the flap gate was broken at the outlet of a 30-inch-diameter RCP side-drainage structure.
- Flood Damage Reduction Channels:
 - Concrete Surfaces: Spalling with exposed rebar was observed on the concrete channel invert near the low-flow channel, measuring 12 inches wide and 6 inches deep. In addition, there was spalling on the channel invert, near the toe of the riverward slope, measuring up to 6 feet wide and 12 inches deep.

1.3.2 Los Angeles River LAR/CC2b Levee Segment

- Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth, including shrubs and trees with trunks larger than 2 inches in diameter, were present on the levee crown, landward slope, landward toe, and within 15 feet of the toe of the landward slope. In addition, there were intermittent tree stumps at the landward toe.
 - Depressions/Rutting: There were depressions and rutting on the landward slope measuring up to 2 feet deep. In addition, there was rutting on the riverward edge of the asphalt-concrete pavement on the levee crown measuring up to 10 inches deep.
- Floodwalls:
 - Encroachments: There was an opening through the floodwall due to the UPRR Bridge.
- Interior Drainage Systems:
 - Vegetation and Obstructions: The outlet or inlet of seven of the side-drainage structures were obstructed by more than 10 percent by vegetation, sediment, debris, and/or homeless encampments.
 - Encroachments: The outlet of a 30-inch-diameter RCP side-drainage structure was abandoned and plugged with concrete. The abandonment of this side-drainage structure was not permitted by the USACE SPL.
 - Tilting, Sliding, or Settlement of Concrete Structures: There was a vertical offset measuring 2.75 inches high between the wingwall at the outlet of the 60-inch-diameter RCP side-drainage structure and the adjacent reinforced concrete slope paving.
 - Culverts/Discharge Pipes: All of the side-drainage structures could not be visually inspected, because either the flap gate at the outlet blocked access and/or the conduit was too small. In addition, video inspection records have not been provided by LACDPW.
 - Flap Gates/Flap Valves/Pinch Valves: Two flap gates were missing at the outlets of the double 8-inch-diameter CMP side-drainage structures. One flap gate was missing at the outlet of the 10-inch-diameter RCP side-drainage structure.

- Pump Stations:
 - Pump Station Operations and Maintenance Equipment Manuals: At two pump stations, the operations and maintenance manuals were not available.
 - Pumps: At one pump station, Pump No. 1 could not be operated due to a broken discharge pipe coupling.
 - Motors, Engines, Fans, Gear Reducers, Back Stop Devices: At one pump station, Pump No. 1 could not be operated and the pump motors were seeping oil at sight glasses.
 - Non-Mechanical Trash Racks: At three pump stations, the trash racks could not be inspected because they were located within a confined space.
 - Megger Testing on Pump Motors and Critical Power Cables: At two pump stations, no megger testing had been performed to date.
 - Intake and Discharge Pipelines: At three pump stations, the intake pipelines could not be inspected because they were located within a confined space. At one pump station, the discharge pipe on Pump No. 1 had a damaged coupling.
- Flood Damage Reduction Channels:
 - Concrete Surfaces: The concrete slope paving was damaged from the top to the toe of the riverward slope, measuring up to 24 inches wide and 3 inches deep.

1.3.3 Compton Creek LAR/CC2 Levee Segment

- Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth, including shrubs and trees with trunks larger than 2 inches in diameter, were present on the landward slope and within 15 feet of the toe of the landward slope.
 - Revetments other than Riprap: The grouted stone was damaged at two locations near the toe of the riverward slope, measuring up to 28 feet in length and up to 3 feet in width. In addition, the grouted stone was undermined at the toe of the riverward slope, measuring up to 3.5 feet high and 18 inches deep, extending the full length under the I-710 Bridge.
- Floodwalls:
 - Non-Compliant Vegetation Growth: Vines with diameters less than 2 inches were obstructing the inspection of the floodwall.
- Interior Drainage Systems:
 - Concrete Surfaces: Spalling was observed on the concrete wingwall at the outlet of the 24-inch-diameter RCP side-drainage structure.
 - Culverts/Discharge Pipes: All of the side-drainage structures could not be visually inspected, because either the flap gate at the outlet blocked access and/or the conduit was too small. In addition, video inspection records have not been provided by LACDPW.
 - Flap Gates/Flap Valves/Pinch Valves: A 36-inch-diameter CMP (lined with concrete) side-drainage structure did not have a flap gate and no documentation was available to show if a flap gate was or was not required. The flap gate was removed at the outlet of the 6-inch-diameter RCP side-drainage structure associated with Compton Creek Pump

Station Unit 2. In addition, the middle flap gate was broken at the outlet of the three 36-inch-diameter RCP side-drainage structure.

- Flood Damage Reduction Channels:
 - Erosion: Erosion measuring 42 inches deep was observed upstream of the sheetpile cut-off wall, where the channel transitions from soft bottom invert to reinforced-concrete invert.

1.4 Overall Rating

The Levee Safety Officer Out-Brief Meeting was held on February 23, 2017. An engineering determination concluded that the observed deficiencies could prevent the LAR/CC2 Levee System from performing as intended during the next significant runoff event. Therefore, the Levee Safety Officer (LSO), Los Angeles District, has determined the overall rating of the LAR/CC2 Levee System to be “Unacceptable.”

An “Unacceptable” system rating is defined as, “One or more items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.”

The USACE SPL Asset Management Division will be notified of the overall rating of the levee system by letter with instructions to correct Critically Unacceptable rated items immediately, Unacceptable rated items as soon as possible, and to correct the Minimally Acceptable rated items within two years so that they do not deteriorate further and become Unacceptable. A public notice will be prepared and coordinated between the USACE SPL and LACDPW. Once the Critically Unacceptable deficiencies are corrected by the USACE SPL, the overall system rating will be revised to “Minimally Acceptable.”

It should be noted that the Los Angeles River LAR/CC2b Levee Segment and Compton Creek LAR/CC2 Levee Segment warranted a Minimally Acceptable rating, but the system was rated “Unacceptable” because of the USACE Los Angeles River LAR/CC2a Levee Segment. If the Los Angeles River LAR/CC2a Levee Segment is repaired, then the Los Angeles River LAR/CC2b Levee Segment and the Compton Creek LAR/CC2 Levee Segment Overall Levee System ratings can be revised to “Minimally Acceptable.”

1.5 Overall System Rating Comparison

Both PI No. 1 and PI No. 2 yielded an Overall System Rating of “Unacceptable” for this levee system. Although the LACDPW levee segments showed improvement in some areas, the USACE SPL levee segment (i.e., LAR/CC2a Levee Segment) did not show improvement between PI No. 1 and PI No. 2. Although USACE SPL received supplemental maintenance funds for LACDA this year, improvements have not yet been scheduled for this particular reach of levee. The “Unacceptable” rating associated with the PI No. 2 was driven by the following:

- Unpermitted fencing, railroads, retaining walls, and adjacent properties inhibit access, maintenance, and flood fighting along the Los Angeles River LAR/CC2a Levee Segment.
- Damage to the grouted stone along the Los Angeles River LAR/CC2a Levee Segment continues to be an issue. The damaged grouted stone was considered to be critically Unacceptable in the PI No. 2.

- The two openings in the floodwall along the Los Angeles River LAR/CC2a Levee Segment and the one along the Los Angeles River LAR/CC2b Levee Segment continue to be an issue as no closure devices are present at these locations. These gaps in the protection were also considered to be critically Unacceptable in the PI No. 2.
- Intermittent subdrains along the toe of the riverward slope were obstructed by vegetation and/or sediment along the Los Angeles River LAR/CC2a Levee Segment. In addition, four subdrain vaults on the channel invert were missing manhole covers and vegetation was observed inside of these vaults. No maintenance records have been provided by USACE SPL.

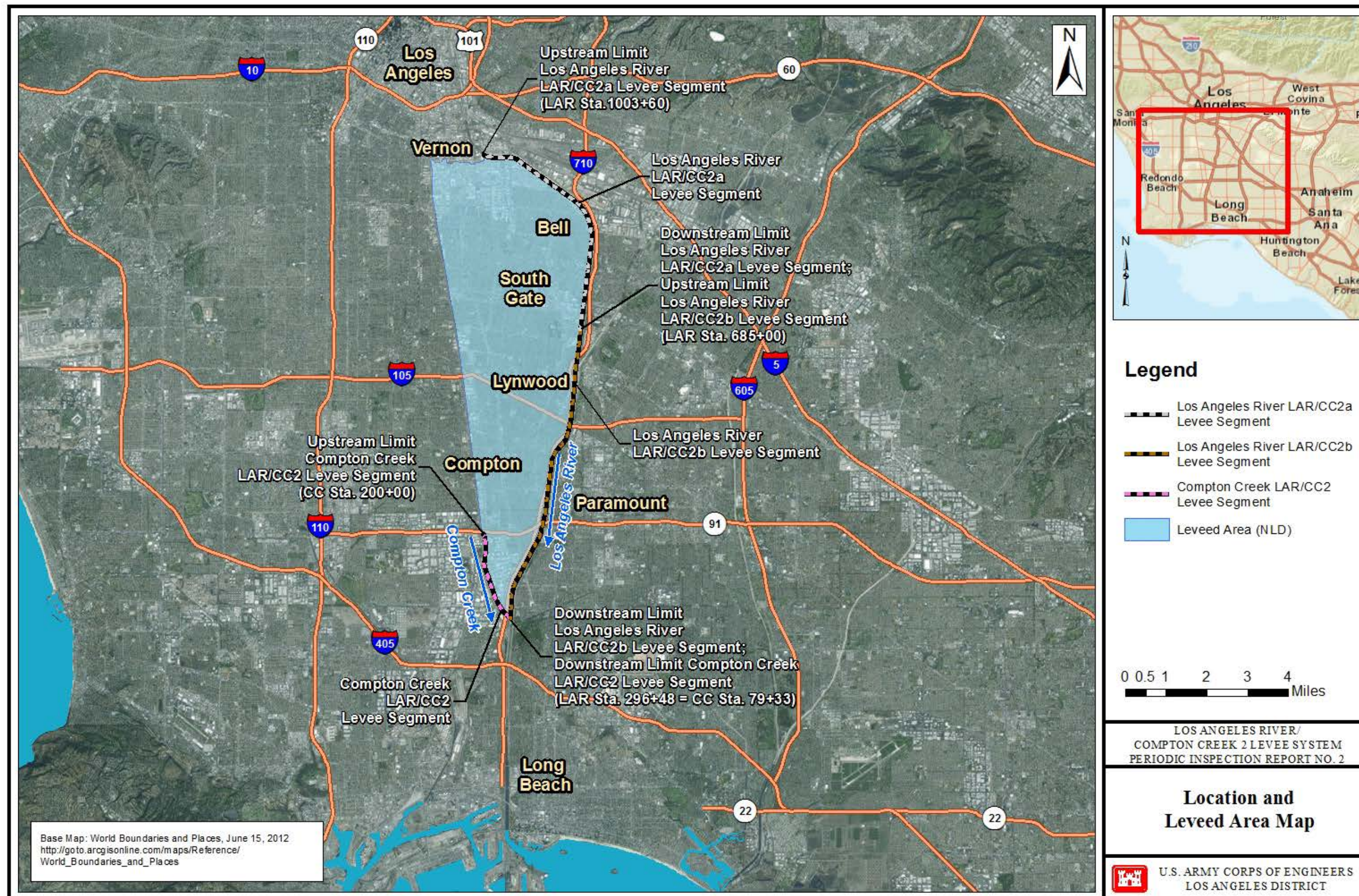


Figure 1