



## MEMORANDUM

**TO:** Megan Nangle, Transportation Project Manager

**FROM:** Amy Wang, David J. Powers & Associates, Inc.  
Will Burns, David J. Powers & Associates, Inc.

**DATE:** June 29, 2023

**SUBJECT: Lead Hazard Technical Memorandum  
The Bay Lights 360**

---

The purpose of this memo is to demonstrate that The Bay Lights 360 Project will not cause a lead contamination hazard above a threshold of concern for the workers removing and reinstalling the lights or future California Department of Transportation (Caltrans) bridge maintenance staff and will not result in any unsafe material for disposal.

### PROJECT DESCRIPTION

The Bay Lights is an existing art installation on the north side of the Bay Bridge's West span and is the world's largest light-emitting diode (LED) light sculpture. The Bay Lights has been lit since March 5, 2013, was replaced in kind in the fall of 2015, and recommissioned in February 2016 as a permanent installation. The proposed Project consists of three main components: (1) the extension of the light sculpture for another 10 years to 2033; (2) the replacement of the light fixtures with newly updated and more robust fixtures and components while keeping the same technical details and intensity of the lights as the current installation; and (3) the addition of light fixtures to the driver's (inward-facing) side of the same suspension cables for a 360-degree view of the light sculpture.

The Project proposes to remove the existing LED lights on the vertical suspension cables of the north-facing side of the upper deck level of the Bay Bridge's West Span.<sup>1</sup> New LED light strands will be installed on the inward- and outward-facing sides of the same suspension cables during the evening/overnight hours from 9:00 p.m. to 5:00 a.m. Sunday through Friday nights, and from 11:00 p.m. to 6:00 a.m. Saturday nights if needed, which will require nightly closure of the outside traffic lanes (lanes 4 and 5) and will take approximately four to six months to complete. The crews will utilize bosun chairs for the high cables and/or bucket trucks for the shorter cables (up to 80 feet) for the removal and reinstallation.

Forty-eight thousand (48,000) energy-efficient LED lights, approximately 1.75" x 2.75" each, will be installed. The LED lights will be secured to the vertical suspension bridge cables at the full height of the suspension cables at one-foot spacing. The lights will be attached to the outward-facing side

---

<sup>1</sup> There are currently no LED lights, nor does the project propose to install any, on the south-facing side of the upper deck of the Bay Bridge's West Span.

(north-facing side only) of the bridge suspension cables with ultraviolet (UV) resistant, heat-stabilized nylon black zip ties at six-inch intervals, so no paint disturbance will occur to the bridge structure and no repainting is needed. The light temperature will be 4,000 kelvin and the brightness will be 87 lumens (at 100-percent brightness) for all fixtures, consistent with the existing lighting. Light fixtures can be replaced individually, if needed.

The backbone fiber trunk line, power line and electrical boxes from previous installation will stay in place with no modifications, except for the internal back plate of the electrical boxes with all existing power supply and fiber switch components, which will be removed and replaced with new components.

The proposed new Bay Lights 360 will be visible from all directions (360-degree view), and will be lit from dusk to dawn for 10 years. The light strands on both sides of the cables can be turned off or dimmed independently of each other with their own separate controls. The light fixtures can also be physically adjusted (rotated).

The light display will be controlled by the artist and will appear to be moving in a wave-like and alternating flickering nonrepeatable but abstract pattern, consistent with the existing lighting.

It is anticipated the proposed installation will start in May, 2023, and be fully installed by December, 2023.

#### **EXISTING ON-SITE SOURCES OF LEAD**

The Bay Bridge was constructed between 1933 to 1936.<sup>2</sup> Due to the date of construction, the paint used at the time to protect and color the bridge had a high lead concentration.<sup>3</sup> Paints contained lead concentrations until 1977, when the United States Consumer Product Safety Commission banned lead paint, because of its health risk effects. The more recent paints used for Bay Bridge maintenance are a zinc based primer, top coated with a latex color coat. However, during the repainting processes the original lead based primer is rarely removed, as it is still the best corrosion protection available.<sup>4</sup>

Because the Bay Bridge paint contains high lead concentrations, it could present a health risk to workers during removal and reinstallation of the lights. The lights will be attached to the outer part of the bridge suspension cables with UV resistant, heat-stabilized nylon black zip ties. It is not anticipated that any paint disturbances will occur to the bridge structure during the removal and reinstallation process; however, if workers encounter any peeling, chipping, chalking, or cracking paint during the process, there is a potential for exposure to lead, particularly during the light removal process. The grime and debris on the bridge may also contain lead.

---

<sup>2</sup> Federal Highway Administration. Two Bay Area Bridges, The Golden Gate and San Francisco-Oakland Bay Bridge. Last Accessed December 2, 2022. Available at: <https://www.fhwa.dot.gov/infrastructure/2bridges.cfm>

<sup>3</sup> Lead paint or lead-based paint (LBP) is paint containing lead, a heavy metal that is used as pigment (either chrome yellow or white). Lead is also added to paint to speed drying, increase durability, retain a fresh appearance, and resist moisture that causes corrosion.

<sup>4</sup> Ken Brown. Division of Maintenance, SMI Toll Bridges. Personal Communication. August 5, 2011.

## MEASURES TO ADDRESS ON-SITE SOURCES OF LEAD

Lead-based paint present on the Bay Bridge could present a risk to workers during removal and re-installation of the lights. The Caltrans *Project Development Procedures Manual, Chapter 18, Environmental Contamination*, defines varying degrees of risk for the presence of hazardous materials: high, medium, and low. The presence of lead paint on structures is a low risk issue, because while this is a condition that will require special provisions for health and safety, it will not need advance cleanup or project design changes. The *Project Development Procedures Manual* notes that if contamination is present, worker health and safety must be considered and measures to eliminate potential harmful worker exposures must be planned for, and included, in the Project. These measures can include a worker Health and Safety Plan and control measures (i.e., contain the work area, minimize dust, and clean up thoroughly).

The Project shall comply with the following sections of the 2022 Caltrans Standard Specifications. The Project is required to conform to the provisions in *Section 12, Temporary Traffic Control*, of the Caltrans Standard Specifications for maintaining traffic during installation and removal of the lights. Section 14-11 of the 2022 Caltrans Standard Specifications includes general specifications relating to hazardous waste and contamination. Caltrans Standard Specification 14-11.13 is for *Disturbance of Existing Paint Systems on Bridges*. Standard Special Provisions (SSPs) are project-specific specifications used when specific issues may be encountered that are not covered by the Caltrans Standard Specifications. SSPs are needed when handling contaminants or meeting specialized hazardous waste regulatory or safety requirements. Under Caltrans Standard Specification 14-11.13, there are procedures for addressing worker exposure to lead based paint, including safety and health provisions. These provisions include providing protective work clothing (i.e., gloves, eye and face protection) and washing facilities for the workers. These provisions also include preparation of a lead compliance plan that documents the compliance program to prevent or minimize worker exposure to lead per the Division of Occupational Safety and Health (Cal/OSHA) and California Code of Regulations (8 CCR § 1532.1) requirements. In addition, before starting any activity that presents the potential for lead exposure to workers, the provisions require a safety training program for workers that complies with specific regulatory requirements and the lead compliance plan.

Caltrans Standard Specification 14-11.13 includes procedures for addressing disturbed lead paint. These procedures include containment of all paint debris and visible dust when the existing paint system is disturbed. The proposed use of the zip ties is not expected to disturb the existing paint, so debris collection and containment should not be necessary. Given that maintenance painting of the Bay Bridge is an ongoing process, it is not likely that workers will encounter disturbed paint in quantities large enough to constitute a high risk and require a collection and containment plan for paint debris, visible dust, and grime.

## CONCLUSION

Because the Bay Bridge contains paint with high lead concentrations, it could present a health risk to workers during removal and re-installation of the lights. It is not anticipated that any paint disturbance will occur to the bridge structure during the removal or reinstallation of the proposed lights; however, if the workers encounter any peeling, chipping, chalking, or cracking paint during the process, there is a potential for exposure to lead. The lights shall be installed and removed in

compliance with Caltrans Standard Specifications, 14-11.13, for disturbance of existing paint systems on bridges, which comprise worker safety and health provisions, including protective work clothing, washing facilities, and training, to reduce the risk for lead exposure.