BAT MITIGATION PLAN

SR-91 SANTA ANA RIVER BRIDGE WIDENING PROJECT

EA-OC5601

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
STREAMBED ALTERATION AGREEMENT NO. 1600-2012-0184-R5

LSA

July 2013

ADDED PER ADDENDUM No. 2 DATED AUGUST 2, 2013

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Prepared by:

Jill Carpenter, Senior Biologist
Bat Specialist
LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731
(949) 553-0666
LSA Project No. CDT1127

for

Shannon Crossen
Associate Environmental Planner (Natural Sciences)/District Biologist
Caltrans, District 12
3347 Michelson Drive, Suite 100
Irvine, CA 92612

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INTRODUCTION

The purpose of this bat habitat mitigation plan is to discuss strategies to minimize impacts to bats during construction activities associated with the widening and seismic retrofit of the State Route (SR-91) bridge over the Santa Ana River for the SR-91 Santa Ana River Bridge Widening Project. These strategies will provide direction to meet the requirements described in the California Department of Fish and Wildlife (CDFW) Streambed Alteration Agreement (SAA) for the SR-91 Santa Ana River Bridge Widening Project (SAA No. 1600-2012-0184-R5) pertaining to project-related impacts to bats. This document also fulfills the requirement set forth in Compensatory Measure 3.1 of the SAA, which stipulates that if a substantial portion of the bat colony is to be excluded for a breeding season or more, a plan will be developed describing the specifics of the existing and replacement roosting habitat and will be submitted to CDFW for review and concurrence. Upon approval from CDFW, the installation of alternate bat roosting habitat, the humane eviction/exclusion of bats, and other recommended mitigation and minimization measures will proceed as described in this document. No deviation from the methodology described in this bat mitigation plan will be made without prior coordination with a qualified bat biologist as approved by CDFW and the Resident Engineer, and authorization/concurrence from CDFW.

BACKGROUND

The California Department of Transportation (Caltrans) is widening the SR-91 Santa Ana River Bridge by adding lanes on to the westbound side of the bridge structure. In addition, a seismic retrofit will be performed while a contractor is mobilized for the widening work; this activity will involve drilling directly into the two hinges and adjacent piers, installing steel cables through the hinges, and attaching the cables to the adjacent piers. The work on this bridge is anticipated to occur over a two-year period.

In February 2012, a daytime habitat assessment was performed at the SR-91 Santa Ana River bridge by LSA Associates, Inc. (LSA) Senior Biologist/bat specialist Jill Carpenter, LSA biologist Sara Louwsma, and Caltrans biologist Shannon Crossen to determine if roosting habitat for bats was present in the bridge structure. During that assessment, two hinges were observed containing crevices suitable for use by day-roosting bats. A large quantity of accumulated guano was observed beneath the southernmost hinge located between Piers 12 and 13, and bat vocalizations were heard from a large section of the hinge with fresh urine staining, indicating the presence of a large number of day-roosting bats. Although a very small quantity of scattered guano was observed beneath the northernmost hinge located between Piers 7 and 8, no fresh urine staining or bat vocalizations were observed at that location. Based upon the prevalence of staining and guano observed throughout the girders of this concrete girder bridge, bats likely utilize the entire bridge for night roosting. Night roosts are used by bats during the evening to rest during foraging bouts, thereby playing an important role in the energetics and social interaction of bats.

A nighttime emergence survey was subsequently conducted at the SR-91 Santa Ana River bridge in June 2012 by Jill Carpenter and Shannon Crossen. During this survey, at least 200 Yuma myotis (*Myotis yumanensis*) were observed emerging from within the southernmost hinge of the bridge structure, located between Piers 12 and 13. A small number of Mexican free-tailed bats (*Tadarida brasiliensis*) were also acoustically detected and observed exiting from this bridge hinge. A dead Yuma myotis juvenile was found among the accumulated guano deposits beneath the expansion joint

crevice, confirming the presence of a maternity colony of this species at this location. Given the knowledge that the hinge contains a maternity colony consisting of mothers and nonvolant (flightless) young, and the fact that over 200 bats were observed exiting from the roost crevice, the biologists estimated that at the time of the survey in 2012 at least 400 bats were day-roosting within the hinge. A nighttime survey was not performed at the northernmost bridge hinge between Piers 7 and 8 because when this crevice was examined with a spotlight during the maternity season in 2012, no bats were observed roosting there. Based upon sparse and sporadic guano deposition observed beneath the hinge, it is likely that a small number of bats periodically roost in this crevice.

The substantial noise and vibration generated by cofferdam construction, pile driving, demolition of the deck overhang, and drilling into the hinges of the bridge structure for the westbound widening and seismic retrofit of the SR-91 Santa Ana River bridge will impact any bats day-roosting in areas in or adjacent to these construction activities. In addition, the seismic retrofit work, which requires drilling through the hinges and adjacent piers at regular intervals, will directly impact the roosting habitat and any bats roosting within the hinges. Maternity colonies, which often involve large numbers of individuals, are particularly vulnerable to roost disturbance. Disruption and disturbance of a maternity roost would be significant, as disturbance of these roosting areas that are crucial to reproduction in bats can lead to roost abandonment and/or mortality of the bats within that roost. Typically, noise and vibration impacts to bats are minimized by restricting this type of work to a period outside of the maternity season, which is generally considered to be April–August in southern California; however, in this case, the flood control restrictions imposed by the County of Orange limit work within the Santa Ana River drainage to the dates of May 1–October 15, which would leave only six weeks outside of the maternity season. As a result, implementing a work restriction at the bridge during the maternity season on construction activities that generate high levels of noise and vibration (e.g., cofferdam construction and pile driving) would cause excessive constraints on the contractor and substantially increase project costs.

Therefore, to minimize impacts to bats roosting within the SR-91 Santa Ana River Bridge, a humane bat eviction and exclusion should be implemented in the fall (September or October) preceding construction activity to temporarily exclude bats from directly affected work areas and thereby avoid potential direct impacts. This exclusion will be performed along the entire length of the hinge between Piers 7 and 8, and the hinge between Piers 12 and 13, which will be directly impacted by concrete drilling activities during the seismic retrofit work.

Alternative bat roosting habitat will be installed prior to the humane bat eviction/exclusion in order to provide alternative roosting sites for the bats, thereby minimizing the impacts associated with evicting a large number of bats from a roosting site. The total length of the alternative roosting structures will be at least half the total length of the crevice habitat that is utilized by bats and subject to impacts from project construction.

The details of the alternative bat roosting habitat installation and the humane eviction/exclusion are described below. Measures to further minimize impacts to bats through implementation of seasonal work restrictions and biological monitoring of the bat colony are also described.

RECOMMENDATIONS

Installation of Alternate Bat Roosting Habitat

As specified in Compensatory Measure 3.1 of the SAA, if a substantial portion of the bat colony is excluded from the bridge for a breeding season or more, alternative bat roosting habitat will be installed to replace the roosting habitat temporarily lost during the eviction/exclusion. Since the entire colony will be displaced for two maternity seasons due to the timing, length, and disruptive nature of the construction work, alternative bat roosting habitat will be created on the structure prior to excluding the bats from the hinge.

This alternative roosting habitat will replace a minimum of half of the length of the crevices known to be used by roosting bats, which was determined by measuring each section in which bats were directly observed, as well as any sections with urine staining and/or guano accumulation indicating previous use by roosting bats. The majority of bats visibly roosting in the hinge were observed in a 30-foot (ft) section of the hinge between Piers 12 and 13, and the cumulative length of the crevice sections containing roosting bats or evidence of roosting bats measured approximately 80 ft. Since sixteen panels with internal crevice spaces measuring 3.0 ft in length will be installed, a total of 48 ft of roosting habitat will be created in the two bays adjacent to the bay containing the maternity roost hinge. Therefore, this alternate bat roosting habitat will replace more than half of the total length of the crevices known to be used by roosting bats. Furthermore, if left unsealed, the section of bridge added during the widening will result in the lengthening of both hinges, further increasing the total amount of crevice habitat on the SR-91 Santa Ana River Bridge. Both the installation of bat roosting panels and the act of leaving the new hinges open for roosting meet the requirement in Compensatory Measure 3.3 of the SAA, which stipulates that similar features in the new portion of the bridge, or other form of alternative roosts, will be provided for roosting.

The general locations on the bridge structure where the panels will be installed are illustrated in Figure 1 (all figures are located in Appendix A). Eight panels will be installed on the concrete girder at the eastbound edge of the bridge between Piers 14 and 15, and eight panels will be installed on the concrete girder at the eastbound edge of the bridge between Piers 15 and 16, for a total of 16 alternative bat roosting habitat panels comprising 48 ft of crevice habitat created. The two bays between Piers 14 and 16 were selected to position the roost panels as close as possible to the bay between Piers 12 and 13 containing the maternity roost hinge crevice while also being situated away from the seismic retrofit work, which will occur in the bays between Piers 6–9 and between Piers 11–14. The roost panels will be installed along the concrete girder at the eastbound edge of the bridge in order to situate them at the farthest possible point on the bridge from the noise associated with the westbound widening activities. Half of the roost panels will be placed on the side of the girder facing the exterior of the bridge, which receives afternoon sunlight, and half of the roost panels will be placed on the side of the girder facing the interior of the bridge. These two different orientations will allow bats to choose from different temperature regimes as well as offer an option of roosting in panels facing toward and away from project-related noise. The qualified bat biologist will determine and supervise the precise placement and orientation of the bat roosting panels within the indicated areas in the field during installation.

The bat roosting habitat panels will be constructed from lightweight concrete according to the design specifications presented in Figure 2. These specifications are based upon a commonly used panel design known as the “Oregon Wedge” that has been successfully used to house maternity colonies of

bats, including Yuma myotis, in a variety of mitigation situations. The basic Oregon Wedge design has been modified for the SR-91 Santa Ana River bridge project by adding a roosting ledge for juvenile bats, which will provide more specific and potentially desirable roosting habitat for a maternity colony. These adaptations were made using input and drawings provided by Greg Tatarian of Wildlife Research Associates, who has extensive experience throughout the State of California creating successful bat roosting habitat designs. Representative photos of Oregon Wedge-style panels installed on a bridge are presented in Figure 3. These alternative roosting habitat structures will remain in place following construction and will not be removed. The installation of the roosting habitat panels will be directly supervised and monitored by a qualified bat biologist approved by CDFW.

This work will be initiated upon approval from CDFW; if approval is granted shortly after submittal of this document, installation of the bat roosting panels may occur as soon as mid-August. The alternate bat roosting habitat panels should be installed as far in advance of the humane eviction/ exclusion as possible to increase likelihood of their discovery and therefore use by the bats currently roosting in the bridge hinges. Methodology for accessing the underside of the bridge structure for the installation will be determined by the consultant biologist in coordination with the Caltrans biologist. In the event that any equipment is used in the Santa Ana River drainage, measures should be implemented per the relevant permit requirements to ensure compliance with water quality regulations.

Humane Eviction/Exclusion of Roosting Bats

Avoidance/Minimization Measure 2.3 of the SAA stipulates that bats are to be excluded selectively and only to the extent necessary to prevent direct impacts. Due to the nature of the work at the SR-91 Santa Ana River bridge, which will include operations such as cofferdam construction and pile driving that produce high levels of sound and vibration as well as drilling through the hinges for the seismic retrofit and the demolition of the westbound deck overhang, bats will be humanely evicted and excluded from the entire hinge between Piers 12 and 13 for the duration of construction work on the bridge. Although few bats are known to roost within the hinge between Piers 7 and 8, a humane eviction/exclusion will also be performed concurrently at that location to prevent the maternity colony from relocating into that crevice after the eviction. Bat roosting habitat panels will have been installed prior to the eviction/exclusion to provide the bats with an alternative roosting location on the eastbound edge of the bridge as far from the westbound widening work as possible. These locations are also situated away from the seismic retrofit work.

The humane bat eviction/exclusion will be implemented in the fall (September or October) preceding construction activity at the SR-91 Santa Ana River bridge in order to temporarily exclude bats from directly affected work areas and from areas where noise and vibration may potentially result in direct impacts. Exclusion is recommended in the fall to avoid impacts to hibernating bats during the winter months or during the maternity season (typically from April through August in Southern California), when flightless young are present.

During installation of the humane eviction/exclusion devices, each crevice will be closely inspected using flashlights and/or a fiber-optic scope for the presence of day-roosting bats. At crevices where the absence of bats can be confirmed, the crevices may be immediately sealed with material such as foam backer rod or pipe insulation secured with construction adhesive to prevent bats from entering

and using these crevices. At crevices where bats are visibly roosting or where their absence cannot be confirmed, humane eviction devices will be installed that will allow the bats to exit the roosting crevice but will prevent them from returning. The qualified bat biologist performing the humane eviction will determine the exact type of humane eviction devices (i.e., one-way doors) and exclusionary material that will be used along the hinge crevice. The one-way doors will remain in place for at least 10–14 days following installation, to allow sufficient time for all bats to vacate the roosting crevice. After this exclusionary period, the one-way doors will be removed and the crevice sealed with foam backer rod and/or pipe insulation secured with construction adhesive. The exclusionary material will remain in place throughout the duration of construction activities at the bridge, and will be inspected by a qualified biologist weekly from March 1–May 31 of each year, and monthly thereafter until the conclusion of construction, as required in Avoidance/Mitigation Measure 2.3 of the SAA. A monthly report summarizing the methods and results of these inspections will be submitted to CDFW for review.

All aspects of the humane eviction/exclusion of bats from the structures will be directly supervised and monitored by a qualified bat biologist approved by CDFW. Following completion of the construction work at the SR-91 Santa Ana River bridge, the contractor (under supervision of a qualified bat biologist) shall remove the exclusionary devices from all hinge crevices where they were installed as required by Avoidance/Mitigation Measure 2.3 and Compensatory Measure 3.3 of the SAA. The action of removing all material from the crevices will allow the bats to return to the roost crevices, thereby resulting in only temporary loss of the bats' preferred roosting habitat in the hinges. If the crevices remain sealed following the end of construction, the loss of roosting habitat for these maternity colonies will be considered permanent.

Methodology for accessing the underside of the bridge structure for the humane eviction/exclusion will be determined by the consultant biologist in coordination with the Caltrans biologist, and will likely involve access from the Orange County Water District levy and associated maintenance/access roads. In the event that any equipment is used in the Santa Ana River drainage, measures should be implemented per the relevant permit requirements to ensure compliance with water quality regulations.

Seasonal Work Restrictions and Noise Minimization

Due to the noise and vibration generated during cofferdam construction and pile driving operations, these activities should not be performed at Piers 13–17 during the maternity season (April 15–August 31) to minimize impacts to maternity colonies of bats roosting in the alternative roosting habitat panels installed between Piers 14 and 15 and to avoid potential abandonment of young, which would be considered "take." The SAA does not authorize "take" of adult or juvenile bats. The contractor may install a noise shroud or sound curtain to attenuate noise from the pile driving and minimize the risk of bats abandoning the alternative roosting sites, particularly when these operations are initiated at Piers 13–17.

Since bats will be excluded from the hinge crevices during construction, and the roosting habitat panels are installed in bays outside of the areas of work for the seismic retrofit, no seasonal restriction on activities associated with the seismic retrofit is necessary.

If construction activities are performed beneath the bridge in the period between dusk and dawn, night lighting should be used only on the portion of the bridge actively being worked on, and focused on the direct area of work. This will minimize visual disturbance and allow bats to continue to utilize the remainder of the bridge for foraging and night roosting.

Biological Monitoring

As stipulated in Compensatory Measure 3.1 of the SAA, the alternative roost site will be monitored quarterly for a 5-year period until the roost is occupied, the existing roost is once again available for occupation and reoccupied as determined by monitoring, and these observations are accepted as satisfactory in writing by CDFW. As part of this monitoring effort, a census of the bat population in the bridge should be performed immediately prior to the humane eviction/exclusion by examining the hinge crevices and the sixteen roosting panels. The roost panels should be examined again at the conclusion of the eviction period to ascertain how many of the bats have moved into the alternate bat roosting habitat.

The number of bats using the alternative roosting habitat panels should be determined again immediately prior to the initiation of construction activities, and a biologist familiar with bats should be present during the start of pile driving and cofferdam installation activities to observe any potential effects on the bats residing within the panels. A biological monitor familiar with bats should also be present for the initiation of cofferdam and pile driving operations occurring at Piers 13–17. If any bats are observed exiting the roost panels when these activities are initiated at the piers near the roost panels, the biological monitor should immediately stop that construction activity for the remainder of the day. The bats will likely abandon the roost that evening, and construction may proceed again the following morning.

At the discretion of the qualified bat biologist in coordination with the Resident Engineer, if bats have completely abandoned the bridge prior to the start of the maternity season due to the high level of noise and vibration occurring from construction activities in other sections of the bridge, and are not present within the bridge during the maternity season, restrictions on work at Piers 13–17 may be lifted. However, if bats abandon the alternative roosts during the maternity season, leaving flightless young behind, this may be considered “take.” The SAA does not authorize “take” of adult or juvenile bats, and consequences could include but are not limited to temporary suspension of project construction activities.

Monitoring of the exclusion devices by a qualified biologist is also required in accordance with Avoidance/Mitigation Measure 2.3 of the SAA. As stipulated in this measure, the exclusion material in the two hinge crevices will be inspected weekly from March 1–May 31 of each year, and monthly thereafter until the conclusion of construction. A monthly report summarizing the methodology and results will be submitted to CDFW for review.

Yuma myotis has been documented roosting in swallow nests, and may roost in the cliff swallow nests located along the westbound edge of the bridge. If the swallow nests are removed to prevent swallow nesting during construction activities, they should be removed in a manner that ensures they do not fall to the ground, and a biologist familiar with bats should be present to examine the swallow nests for roosting bats. This removal may be done concurrently with the humane eviction/exclusion, since equipment to access the area beneath the bridge deck will be on-site.

CONCLUSIONS

The alternative bat roosting habitat panels should be installed as far in advance of the humane eviction/exclusion as possible in order to increase likelihood of their discovery and use by the bats currently roosting in the bridge hinges; therefore, the installation of bat roosting panels will be initiated shortly after receiving approval from CDFW. If approval is granted shortly after submittal of this document, installation of the bat roosting panels is anticipated to occur in mid-August 2013. Monitoring of these roosting habitat panels will commence shortly after installation and continue for up to 5 years until released from this requirement from CDFW in writing as required in the SAA.

Implementation of the alternative roosting habitat installation, humane eviction/exclusion, seasonal work restrictions, and biological monitoring as described in this plan are expected to reduce project-related impacts to bats to the greatest extent practicable given the nature and duration of the work at the SR-91 Santa Ana River bridge. However, Caltrans does reserve the following disclaimer relating to required operations.

> Disclaimer:
>
> The structural elements and features that facilitate the life history of bat species on a bridge or other transportation facility are subject to regular inspection, repair, rehabilitation, alteration, and/or replacement as part of normal operations and maintenance, and may on occasion reduce or eliminate the habitat values provided.
>
> [Caltrans] will take reasonable measures to avoid and minimize unnecessary disruptions to the animal's normal behavior patterns, which include, but are not limited to, breeding, feeding and sheltering. However, this accommodation does not preclude [Caltrans] from future engineering actions that are found to be necessary to meet the transportation needs of California, or from measures to ensure the safety of the public or [Caltrans] personnel. Habitat values may be removed with little or no advanced notice in those situations where it is necessary to immediately prevent or inspect damage or where the stability of the structure is in question.

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APPENDIX A

FIGURE 1: PROPOSED LOCATIONS FOR ALTERNATIVE BAT ROOSTING HABITAT
FIGURE 2: PROPOSED DESIGNS FOR ALTERNATIVE BAT ROOSTING HABITAT STRUCTURES
FIGURE 3: REPRESENTATIVE PHOTOS OF ALTERNATIVE BAT ROOSTING HABITAT STRUCTURES

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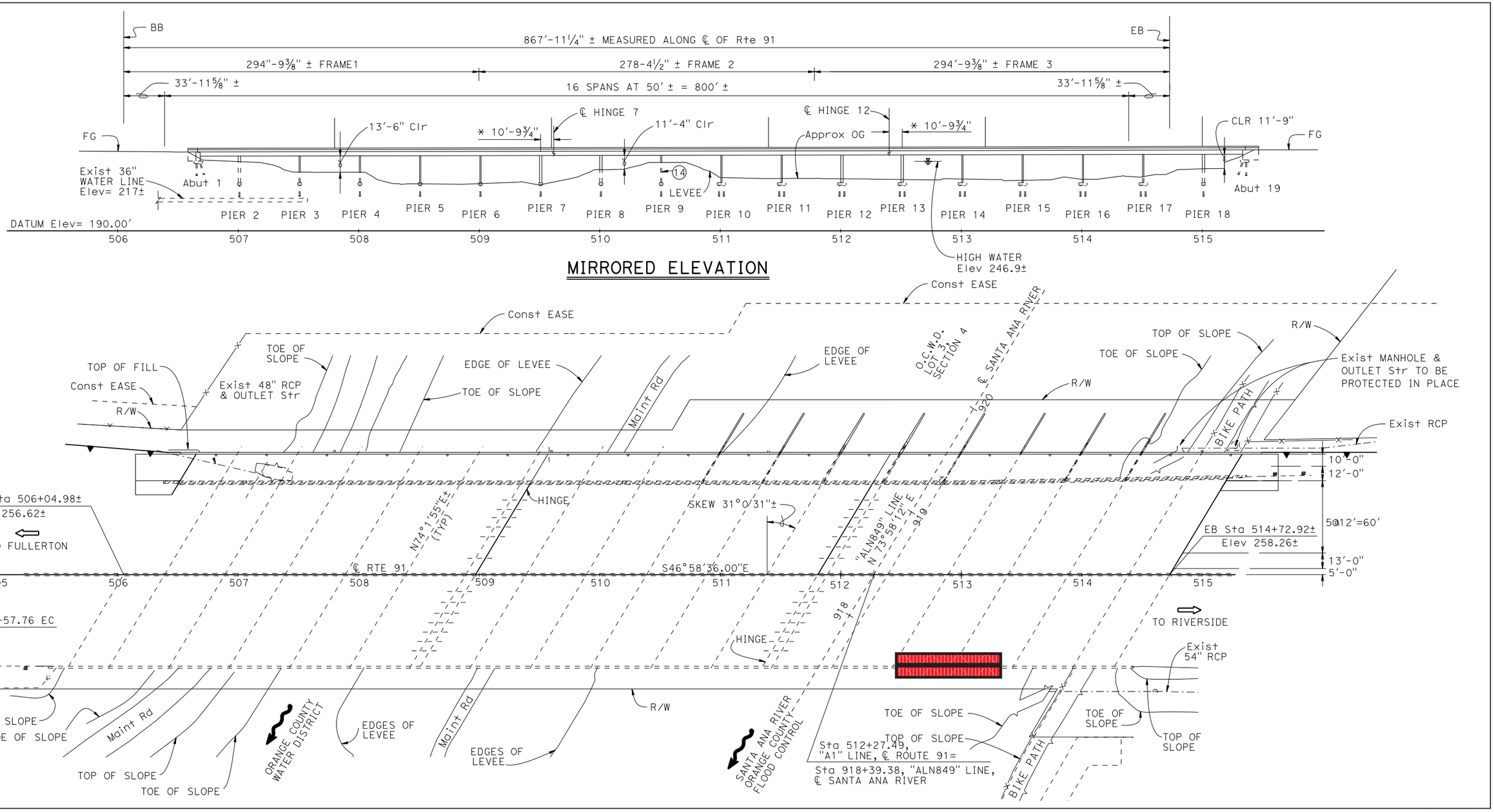

LSA

LEGEND

- BAT ROOSTING HABITAT PANELS
- NEW STRUCTURE
- EXISTING STRUCTURE
- BRIDGE REMOVAL PORTION
- DIRECTION OF TRAFFIC FLOW
- MEASURED PARALLEL TO ℄ Rte 91

N

0 40 80

FEET

SOURCE: State of California Department of Transportation 1/30/13

I:\CDT1127\G\Bat Structures Loc.cdr (7/19/13)

FIGURE 1

SR-91 Santa Ana River Bridge Widening Project
EA-OC5601
Bat Mitigation Plan

Proposed Locations for Alternative Bat Roosting Habitat Structures

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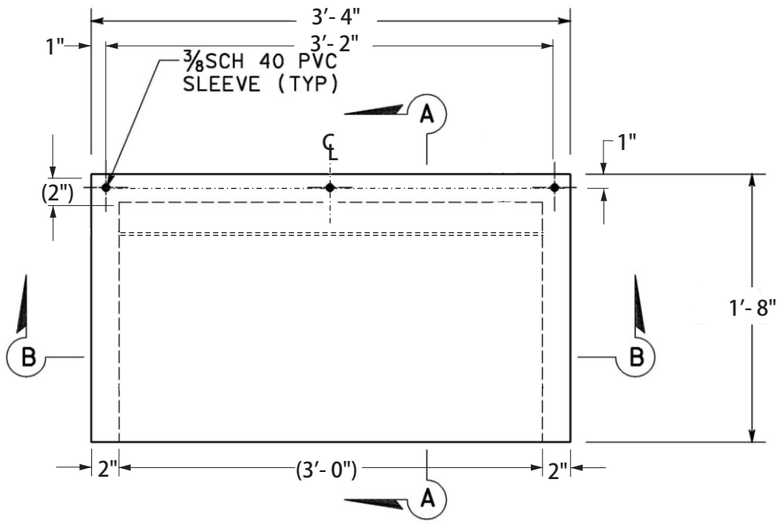
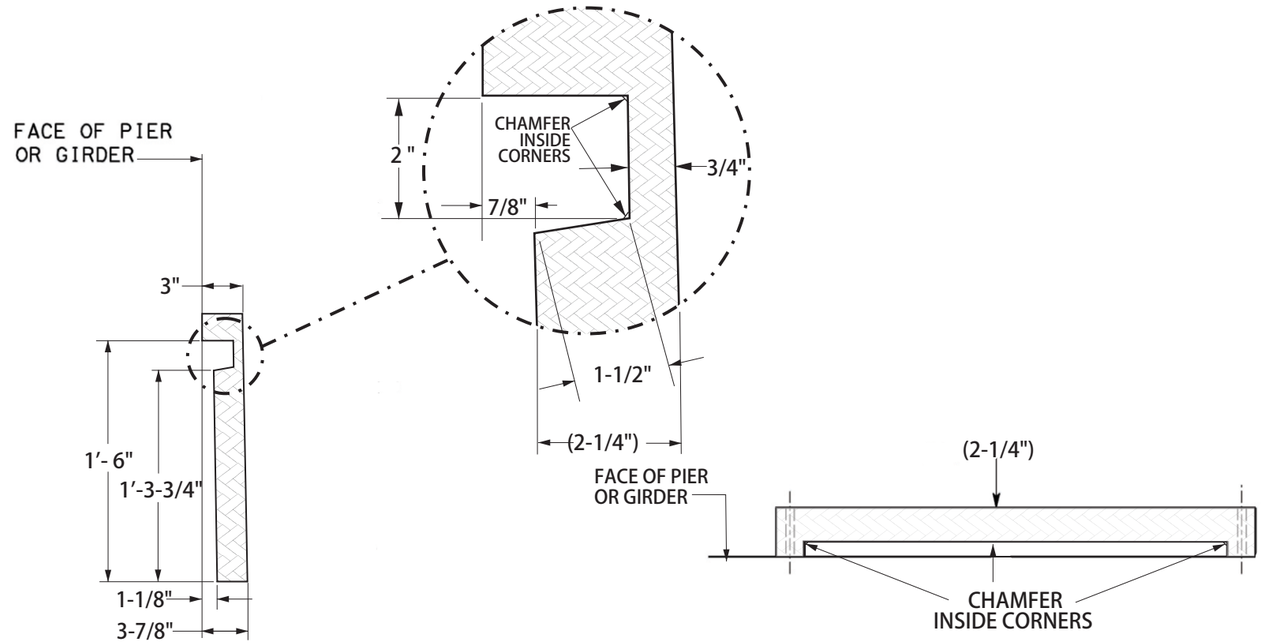


PLAN



SECTION A-A

SECTION B-B

NOTES:*

1. USE 3⅜" SCH 40 PVC PIPES x 1¾"
   3- RED HEAD WEDGE ANCHOR - 3/8" X 5"
   f'ci = 4000 psi (LIGHT WEIGHT CONC.)
2. USE "CHICKEN WIRE" OR EQUIVALENT FOR REINFORCEMENT IN 3/4" SLAB.

***These bat roosting panel designs were created and modified with input and sample designs provided by Greg Tatarian of Wildlife Research Associates, Inc. (www.wildliferesearchassoc.com)**

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FIGURE 2

SR-91 Santa Ana River Bridge Widening Project
EA-OC5601
Bat Mitigation Plan

Proposed Designs for Alternative Bat Roosting Habitat Structures

I:\OCY0901W\G\Alt Bat Roosting Struct.cdr (7/23/13)

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Representative view of Oregon Wedge-style bat roosting panels installed on girders beneath a bridge. The panels shown here are currently occupied by a large number of day- roosting bats.

View looking straight up into the crevice spaces created by Oregon Wedge-style bat roosting panels installed on girders beneath a bridge.

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FIGURE 3

SR-91 Santa Ana River Bridge Widening Project
EA-OC5601
Bat Mitigation Plan

Representative Photos of Alternative Bat Roosting Habitat Structures

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