



# Chapter 7: Environmental Considerations

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## 7-1 Introduction

A structure cannot be built, maintained, or removed without having an impact on the environment. The very scale of bridge removal projects imposes costs upon the environment in which we live. With that acknowledgment, the goal is to minimize negative impacts of the improvement on the environment. Many of the methods of achieving this goal are formally codified in the laws, permits, licenses, and certifications that are relevant to the execution of bridge removal operations. Good judgment and the best general practices are to be applied, as it is not possible to delineate every possible situation that might arise in the course of the work.

In the [Contract Specifications](#), Section 14, *Environmental Stewardship*, the acronym PLAC is used for the permits, licenses, agreements, and certifications that are specific to the work and the job site. To fulfill the requirements of the PLACs, the Structure Representative and the Contractor must be familiar with these documents. The PLACs are sometimes supported by reports or opinions that can give a more complete understanding of the resource being protected. During the project development stage, the assistance from a representative from Structure Construction can be useful in identifying means and methods for bridge removal that are appropriate to the work and the site.

The contract requires the Contractor to submit, for authorization, detailed plans for bridge removal. A significant part of these plans addresses the goal of minimizing environmental impacts. Early familiarization of the PLACs will aid in the timely review of the Contractor's plans. See Figure 7-1, 7-3, and 7-4, for illustrations of debris containment and processing.

Environmental stewardship is broader than merely keeping demolition contaminants out of the air and water. Bridge demolition can be disruptive to neighbors, commerce, and natural habitats. Environmental stewardship includes protection of cultural resources of known or suspected archaeological sites. Sometimes even the bridge itself has historical significance that is worth preserving. All projects benefit from planning that anticipates appropriate stewardship, but the execution in the field of the authorized bridge removal work plan is the task that pays the most dividends and minimizes costs.

The PLACs and contract requirements for environmental resource protection are extensive and cover a wide range of topics and disciplines. The intent of this chapter is not to repeat or attempt to educate on these matters in depth but to make the reader aware, in a general sense, of the requirements and to investigate further when bridge removal is required as a part of the project.

## 7-2 Stormwater Pollution Prevention Program (SWPPP)

The best stormwater management practices are to be utilized on all construction projects. Bridge removal has the potential for generating objectionable material that requires containment and removal from the site to a proper disposal location. Methods need to be employed to keep contaminants out of runoff and the Waters of the State. This can be a difficult task, especially if the demolition is a bridge over water. Debris platforms, impenetrable barriers, diversions, or other means can be deployed. See Figure 7-1 and Figure 7-5 for illustrations of water diversion through bridge removal projects. A substantial part of any bridge removal work plan will involve containment of contaminants and handling of potential stormwater runoff.

Under the National Pollution Discharge Elimination System, administered by the Federal Environmental Protection Agency (EPA), there are very specific requirements for sites over one acre.

The *Contract Specifications*, Section 13, *Water Pollution Control*, addresses the general contract considerations pertinent to this topic. Detailed in Section 13 is a list of several Department manuals regarding the administration and best general practices to limit water pollution. The Department continues to invest in mandatory training to protect the waters of the State. The Structure Representative and staff benefit from participation in this training, and the project benefits from the consistent and uniform administration of the best management practices (BMPs).

A review of the provisions in Section 13 will emphasize that the protection of the Waters of the State is an active, involved task. Minimizing water pollution during bridge removal requires considerable training, planning, execution, monitoring, sampling, and documentation.



**Figure 7-1. Clear Water Diversion Through Culverts with Bridge Removal on Gravel Pad, Sulpher Creek**



**Figure 7-2. Debris Containment Platform, Honcut Creek**



**Figure 7-3. Debris Processing/Storage Area, Marysville**



**Figure 7-4. Debris Processing with Water Pollution BMPs in Place, Simmerly Slough**



Figure 7-5. Water Diversion, Romero Creek

## 7-3 Air Quality

The *Contract Specifications*, Section 14-9, *Environmental Stewardship – Air Quality*, requires compliance with specific government codes. The *Special Provisions* and PLACs will address specific identified hazards applicable to the project.

The Federal EPA sets minimum national air pollution standards. The California Air Resources Board (CARB) works in tandem with the EPA and addresses California's specific needs with additional standards and enforcement. CARB addresses statewide sources of pollution including mobile sources of pollution such as vehicles. California has 35 local air districts that address emissions from businesses and stationary sources of pollution. Local geography and population density uniquely impact air quality which results in regulations that vary regionally.

Bridge removal and construction in general, are potential local sources of air pollution.

### 7-3.01 Asbestos

The California Air Resources Board enforces compliance with the Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulation for asbestos and investigates all related complaints, as specified in the California Health and Safety Code (HSC), Section 39658(b)(1).

Of the 35 air districts in California, 16 of these districts do not have an asbestos program in place. In these "non-delegated" districts, a demolition/renovation notification is required for compliance with the Asbestos NESHAP (note that this notification is not equivalent to a permit). The Contractor must submit their Asbestos Notification form to the EPA with a copy of the notification submitted to CARB, who in turn reviews and investigates the notifications. The local air district can be contacted for compliance requirements.

Asbestos can be a concern in bridge removal. Naturally occurring asbestos is sometimes present in aggregates used to produce structural concrete or present in the local geology. Manufactured asbestos products may be present in bearings, rail shims, piping, or joint material in older bridges. Asbestos' ability to resist fire and microbial attack once made it a popular component in siding, shingles, insulation, flooring, and stucco products. These typical building products were once frequently used in the control houses on movable bridges. Sometimes materials containing asbestos can be identified on bridge as-built project plans, but usually the only way to accurately determine the presence of asbestos is through a survey that includes sampling and testing.

Asbestos removal is to be performed by a qualified contractor. Means and methods of asbestos removal can include containment barriers, worker protections, and air monitoring. Refer to Figure 7-6, which shows asbestos shim removal on a bridge project.



Figure 7-6. Asbestos Shim Removal from a Bridge Rail

### 7-3.02 Burning

The *Contract Specifications*, Section 14-9.02, *Environmental Stewardship – Air Quality – Air Pollution Control*, prohibits the disposal of waste by burning.

### 7-3.03 Dust

Nuisance dust can be a hazard and adequate control is required. Water is a common dust palliative used during bridge removal. See Figure 7-7 for an example of dust control application.

Often, dust generated by bridge removal activities has an increased hazard potential. Saw cutting or grinding concrete, or any activity that places silica into the air, is a concern. Excavations that disturb the aerially deposited lead near transportation facilities might produce hazardous dust. The *Contract Specifications*, Section 14-11.04, *Environmental Stewardship – Hazardous Waste and Contamination – Dust Control*, requires any activity that might generate hazardous dust must not result in visible dust migration.



Figure 7-7. Water Applied to Control Dust, Simmerly Slough



## 7-4 Lead Compliance

Demolition activities that disturb the lead paint on steel structures will likely require specific means and methods. Cutting lead painted steel with a torch generally requires that the lead paint be abated first to avoid lead fumes, which are highly toxic. Peeling and flaking lead paint might require a containment barrier (illustrated in Figure 7-8) to keep the paint out of the air, soil, and water.



Figure 7-8. Containment System and Work Platform, Feather River

## 7-5 Biological Protection

### 7-5.01 Environmentally Sensitive Area (ESA)

This is generally delineated on the project plans as an ESA and is usually one of the first orders of work. The Department will mark the specific ESA locations in the field. The Contractor will install high visibility fencing to protect the resource; an example of this is illustrated in Figure 7-9. Environmentally Sensitive Areas are used to protect many categories of resources, including but not limited to archaeological, biological, and paleontological. A single plant or an entire ecological area can be protected by an ESA. The standard operating procedure is to install the ESA fencing before the work begins and then stay out of the area.

Bridges are often over or adjacent to soils that are sensitive to disturbance or compaction, generally found in wetlands. The *Special Provisions* sometimes require temporary protective mats to limit damage by vehicles. These can be common wooden crane mats or a specifically manufactured product. Sometimes round cobbles or river run gravels are used effectively for stream crossings.



Figure 7-9. High Visibility Fencing used for ESAs

## 7-5.02 Nesting Birds

Swallows, barn owls, and peregrine falcons are just a few species known to nest on bridges, as shown in Figure 7-10 and 7-11.

One of four international conservation treaties, the Migratory Bird Treaty Act protects most species of birds that nest on structures. The Act has significant fines associated with taking of any protected species, feathers, active nests, or eggs. A demolition project can be delayed an entire season if actions are not taken to exclude birds from the bridge. In California, exclusion netting may have to be installed in the winter to be in compliance with the Act. In addition to exclusion netting, removal of old nests is the general practice. Scheduling can be an issue on anticipated contracts, as the exclusion work may need to be performed prior to the contract award date. Exclusion netting is not always 100% successful. A poor installation or use of inappropriate materials may entrap and kill birds. Netting may require significant maintenance and require the constant removal of new unpopulated nests. Refer to Figure 7-12 for typical bird netting

installation. Demolition work should anticipate the expense and time required to maintain compliance with the Act.

It has become common to require bird surveys near a demolition project and ongoing monitoring of the bird population during construction. It is sometimes required that a qualified biologist produces a comprehensive wildlife management plan and monitors the implementation of the plan during construction. Often, the Department enters into a permit agreement for construction work with a lead wildlife agency for the duration of the work with specific requirements and date restrictions for all work. Such a permit is usually made part of the construction contract and all parties are bound by its provisions. Construction activities, including demolition and noise generation, can impact nesting birds in adjacent habitats. Harassment activities can be restricted or prohibited, especially if an endangered species is present.



**Figure 7-10. Common Location for Swallows' Nests on Bridges**



**Figure 7-11. Swallows Nests**



**Figure 7-12. Bird Netting Installed Prior to Demolition**

### 7-5.03 Bats

Most bats are migratory and exclusion methods are often employed prior to bridge removal work. Bats often reside within colonies and their numbers can be significant on a structure. Bats can roost and raise their young within box girder bridges, bridge joints, or hollow piers. A long period of habitation can result in significant quantity of bat guano that can be a health concern for workers. New bridges often include provisions to mitigate the removal of bat habitat, as shown in Figure 7-13.



Figure 7-13. Bat Habitat on New Bridge

## 7-6 Noise

Many demolition methods produce objectionable levels of noise. In some jurisdictions this may limit the means and methods or hours of operation. Noise can have negative impacts on fish or other wildlife. On occasion, it is necessary to relocate adjacent residents or compensate commercial establishments for the disruption. It is always best to anticipate potential problems and plan to mitigate as effectively as possible. Sometimes it is necessary to monitor noise levels for contract compliance. Cal/OSHA requires contractors to protect employees from noise hazards. *Contract Specifications, Section 14-8, Environmental Stewardship – Noise and Vibration*, limits the maximum nighttime noise level.

The primary regulation and enforcement of objectionable noise is the responsibility of local governments. Local jurisdictions may limit volume or hours of operation. Bridge removal operations can be impacted by noise complaints from adjacent citizens and businesses.

Many jurisdictions in California have noise ordinances. Emergency work is often specifically exempted from local ordinances because it is recognized as necessary to preserve life or property. Sacramento City Code, for example, has a typical ordinance that prohibits the use of a hammer or hydraulic hammer between 2200 and 0700 hours. Permissible lane closure times and nighttime work windows may conflict with local ordinances restricting noise and should be anticipated. Restrictions often reference the background noise level, which can be elevated near transportation facilities. Noise restriction may require the use of alternate methods in lieu of hammers, or the erection of baffles or some other means of mitigation; refer to Figure 7-14 for an illustration of sound control blankets in use. Public notification of the purpose and duration of potentially objectionable noise might promote public acceptance of short-term impacts. Notification to nearby neighbors with a contact number may help resolve issues. Documentation of noise levels may also be required and prove useful. A few urban jurisdictions issue noise permits for construction activities. Generally, a noise permit gives specific permission to exceed noise levels for documented activities and time frames.

Somewhat related to noise are ground vibrations and underwater sonic disturbances. Installing temporary piles for an access trestle or a containment structure has many of the same impacts as a permanent installation. Fish and wildlife impacts may require mitigation through the use of bubble curtains.



**Figure 7-14. Sound Control Blanket on the Continuous Truss of Bay Bridge**