

Bridge Removal Work Plan Review

This attachment has been developed to assist field personnel responsible for the administration and review of the bridge removal work plan. It is intended to address common issues and the quality assurance measures to be employed when reviewing demolition operations. The review and processing of a removal work plan needs to be thorough and well documented.

The following information is a general outline and is not to be taken as an all-inclusive list for bridge removal review. Safety is the priority; if something does not look appropriate, do not compromise safety. If further assistance is needed, consult the Bridge Construction Engineer or contact the SC Falsework Engineer. The information presented is based on the requirements described in the *Contract Specifications*, Section 60-2.02, *Existing Structures – Structure Removal – Bridge Removal*, however, the Special Provisions may modify these requirements.

Prior to Plan Submittal

Submittals involving bridge removal are often lacking required information. Thorough consideration, pre-planning, and early communication with the bridge removal contractor can minimize delays with authorization and ensure a quality bridge removal work plan is submitted. Begin communication before the bridge removal work plan is submitted. Though not required by the contract, a pre-submittal meeting or phone call would ensure the contractor understands all that is expected in the submittal. Topics to consider are as follows:

1. Recommend that the contractor investigate the as-built condition of the structure and determine if any special conditions exist, e.g. column pins and deck hinges may need to be restrained during bridge removal operations. The RE Pending File will include the as-builts for the structure to be removed. If the as-builts are not included, obtain them from [BIRIS](#).
 - a. *Contract Specifications*, Section 2.1.06B *Bidding – Bid Documents – Supplemental Project Information*, directs the contractor to request the as-builts from Structures Maintenance and Investigations (SM&I). Due to current confidentiality standards, SC Staff are not to give out as-builts to the contractor.
2. A complete bridge removal work plan must be submitted to receive an expeditious authorization. Some items worth reminding the contractor include:
 - a. If protective covers are required or superstructure removal is performed, the bridge removal work plan must include substantiating calculations and be

signed by an engineer who is registered as a Civil Engineer in the State of California.

- b. The review time is 20 days unless the modified by the *Special Provisions*.
- c. The plan must detail the procedures and sequence for removing portions of the bridge(s), including all features necessary to remove the bridge(s) in a safe and controlled manner.
- d. Where calculations are required, the calculations must demonstrate the stability of the structure at each stage of removal.
- e. Before removing portions of monolithic concrete elements, make a 1-inch deep saw cut along the limits of removal on elements that will be visible in the completed work.
- f. If the contractor is removing a portion of a bridge (e.g. barrier rail only, edge of deck for a widening), the removal operations must be performed without damage to any portion of the structure that is to remain in place. In such cases, tools with a manufacturer's rated striking energy in excess of 1,200-foot pounds per blow must not be used for breaking or removing concrete, which is attached to, or supported by, the bridge.

If work is performed over or adjacent to a railroad, review the additional requirements contained in [Attachment 2](#), *Bridge Removal Over and/or Adjacent to Railroad Tracks*. Last minute modifications to the submittal will cause a delay in the authorization.

Initial Review

When the Bridge Removal work plan is submitted, perform an initial review to verify that the submittal is complete and contains all information necessary for SC staff to perform the review. This is useful for complicated submittals where review time is a factor. The plan must be suitable for the site conditions present and must provide information clearly outlining the removal procedures proposed by the contractor. The following are some basic items to check for in your initial review:

1. When protective covers are required or superstructure removal is performed, verify calculations are provided and the bridge removal work plan is prepared by an engineer who is registered as a Civil Engineer in the State of California.
2. Verify calculations for vertical shoring, restraining systems for columns, and deck hinges are included when these elements are included in the bridge removal work plan.
3. Ensure that descriptive information including the removal methods, staging, and sequence of removal is included.

4. Verify that equipment lists, axle loadings, and proposed equipment placement locations are included.
5. Verify timeline, milestones, and contingency plans are included when traffic closures, potential safety problems, or construction windows are of concern.
6. Verify information providing for the protection of existing utilities and non-highway facilities is included, as required in the *Contract Specifications*, Section 5-1.36, *Control of Work – Property and Facility Preservation*.
7. If bridge removal is intended over and/or adjacent to railroad tracks, ensure the additional requirements described in Attachment 2, *Bridge Removal Over and/or Adjacent to Railroad Tracks* are included.

Review

1. Verify the safe work areas for the contractor's personnel and Caltrans personnel are shown on the bridge removal work plan. Verify the protection of public traffic and private property is adequate, including the safe routing of public traffic during demolition operations.
2. Review the equipment described is adequate to perform the removal work. Review the location of the demolition equipment and the method in which the equipment will be used to remove the structure.
3. Verify the calculations are adequate to demonstrate the stability of the structure during all stages of the removal operations. Evaluate the stability of the structure under live loads during bridge removal per *Contract Specifications*, Section 5-1.37B, *Control of Work – Load Limits*. This is critical when a portion of the structure is to remain standing and equipment is to stay on the structure.
4. Verify a freely falling mass or a falling mass attached to a cable, rope, or chain is not be used for breaking or removing concrete attached to or supported by bridges.
5. Verify concrete not attached to or supported by bridges is not be demolished within 30 feet horizontally of any area open to the public unless adequate protective shields are in place. Verify any necessary debris shields needed to protect the surrounding area, structural elements, and falsework are detailed and shown on the bridge removal work plan.
6. Evaluate the potential for damage due to demolition debris falling on the roadway section, adjacent structure, supporting falsework, protective cover, or structural elements supporting the structure being removed. If debris build up is anticipate, these loads should be considered in addition to equipment loads.
7. Verify dust control provisions are adequately addressed.

8. If traffic closures are involved, verify operational timelines are reasonable within the traffic closure windows. Verify progress is monitored against planned progress milestones and a reasonable contingency plan is provided should the work fall behind planned progress.
9. Verify the location of temporary hand railing and barrier railing for bridge decks is adequate for staged bridge removal for the protection of construction staff and the traveling public.

External Agency Requirements

Often bridge removal involves external agencies. Some of the coordination efforts that must take place are identified below:

1. The contractor must comply with all local sound, water, noise, and air pollution control requirements.
2. The contractor must coordinate with other entities per *Contract Specifications*, Section 5-1.20A, *Control of Work – Coordination with Other Entities – General*. One typical example may include obtaining a disposal permit for disposal of material outside the highway right of way.
3. A Cal/OSHA permit is required for demolition of any structure over 36 feet.
4. If bridge removal is performed over or adjacent to railroad tracks, a railroad agency review of the bridge removal work plan is required. Notify the agency well in advance of the work, especially if the demolition work is a critical path item on the project schedule. Information regarding working with railroads can be found in the following locations:
 - a. *Contract Specifications*, Section 5-1.20C, *Control of Work – Coordination with Other Entities – Railroad Relations*.
 - b. Information Handout included in RE Pending File, titled *Railroad Relations and Insurance Requirements*.
 - c. Attachment 2, *Bridge Removal Over and/or Adjacent to Railroad Tracks*. The procedure for authorizing these plans is identical to that used for falsework plans. The instructions can be found in the *Falsework Manual*, Section [2-4.02B](#), *Review Procedure when Railroad Company is Involved*.