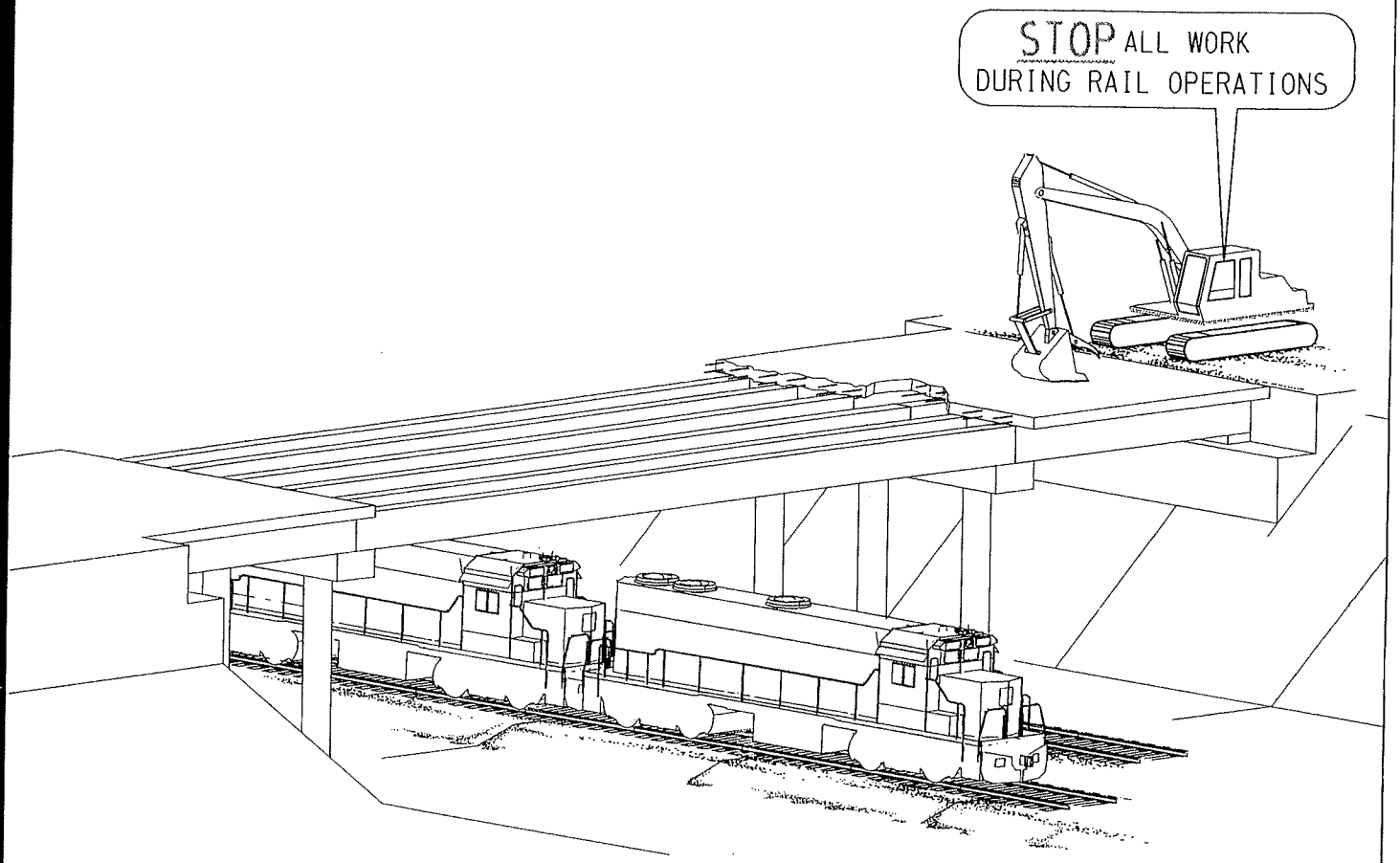
# GUIDELINES FOR PREPARATION OF A BRIDGE DEMOLITION AND REMOVAL PLAN FOR STRUCTURES OVER RAILROAD




**UNION PACIFIC RAILROAD**

OFFICE OF CHIEF ENGINEER DESIGN
1416 DODGE ST.
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## I. GENERAL

A. The Contractor's work shall in no way impede the train operations of the Union Pacific Railroad.

B. The Contractor shall develop a work plan assuming that minimal track windows will be available.

C. The Contractor shall be responsible for planning and executing all procedures necessary to remove the overhead bridge in a safe and controlled manner.

D. The Railroad's tracks and property shall be protected at all times.

E. The contractor shall ensure the area immediately adjacent to operational tracks shall remain free from stumble or like hazards to the ground Railroad personnel to prevent injuries. Open excavations shall be in accordance with current CE Drawing 106613 and shall be protected by appropriate fencing.

F. The words "demolition" and "removal" will be used interchangeably.

G. All removed materials shall be disposed of outside the Railroad right-of-way at no expense to the Railroad.

H. No work is allowed within 50 feet of the nearest rail when trains pass the work site.

I. Staged demolition of the portions of structure immediately adjacent to operational tracks will not jeopardize the integrity of the structure over said tracks until actual removal of the portion of the structure over the tracks is being done.

J. A flagman is required when any work is performed within 25 feet of the nearest rail.

K. No blasting will be permitted on Railroad's right-of-way.

## II. BRIDGE REMOVAL PLAN

A. The Contractor shall submit a complete Bridge Removal Plan to the Railroad. The Bridge Removal Plan shall include details, procedures and the sequence of staged removal of the bridge, including all steps necessary to remove the bridge in a safe and controlled manner.

B. The Contractor shall submit to the Railroad; three (3) complete sets of the Bridge Removal Plan for review and comments. The Plan shall be sealed by a Civil or Structural Engineer registered in the state where the proposed demolition will take place. A minimum of three (3) weeks shall be allowed for the Railroad's review after the complete submittal is received. No removal operations will be permitted over the Railroad right of way until the submitted material has been reviewed and comments provided.

C. Review and comment of the Removal Plan by the Railroad will not relieve the Contractor of the ultimate responsibility and liability for the demolition of the structure.

D. The Removal Plan shall include the following:

1) Plan, elevation and location of the bridge, and the locations of any access roads needed for movement of the equipment. The as-built drawings may be used for the submittal provided the removal steps are clearly marked and legible.

2) Indicate the position of all railroad tracks below the bridge and identify each track as mainline, siding, spur, etc.

3) Bridge removal sequence and procedures for entire bridge including the staging for the removal of the superstructure and substructure.

4) List type and number of equipment required and their locations during demolition operations.

5) Locations and types of temporary supports, shoring or bracing required. These members shall be designed to meet Union Pacific Railroad current standard drawing 106613 "General Shoring Requirements", "Guidelines for Design and Construction of Falsework for Structures Over Union Pacific Railroad", "Guidelines for Design and Construction of Shoring Adjacent to Active Railroad Tracks", and the appropriate local and national building and design code requirements.

6) The proposed vertical and horizontal clearance from all tracks to the temporary and permanent supports. The minimum vertical and horizontal clearances shall be as per attached frame protection details.

7) If any temporary supports interfere with the natural drainage along the Railroad right-of-way, a temporary drainage plan shall be submitted for review and comment prior to constructing temporary supports. The proposed drainage plan shall route all drainage away from the railroad tracks.

8) Details, limits, and locations of protective covers or other measures proposed to be used to protect the tracks. This includes any shields or other measures that will protect the tracks from falling debris during removal of the overhead bridge and from any debris rolling down the side slopes or otherwise coming into the area around the tracks which could affect train operations. Design loads, including impact loads, shall be noted. In addition equipment should be on site capable of removing debris and track shield from operational tracks.

9) All procedures necessary to remove the bridge in a safe and controlled manner. The estimated time for complete removal over the tracks shall be noted.

10) All overhead and underground utilities in the area affected by removal of the bridge shall be located on the drawings, including any fiber optic, railroad signal, and communication lines.

11) The location and details of track crossings required for moving of the equipment across the railroad tracks.

12) Limits of demolition of substructures.

13) Details of on-site fire suppression.

## III. PROCEDURE

A. During removal operations the remaining structure shall be stable during all stages of the removal operations.

B. Prior to proceeding with bridge removal the sealing Civil or Structural Engineer, or his authorized representative working for the Contractor, shall inspect the temporary support shoring, including temporary bracing and protective coverings, for conformity with the working drawings. The Engineer shall certify in writing to the Railroad that the work is in conformance with the drawings and that the materials and workmanship are satisfactory. A copy of this certification shall be available at the site of work at all times.

C. Coordinate the removal schedule with the Railroad. All the removal work within the track area shall be performed during the time windows when the trains are not passing the work site.

D. All substructures shall be removed to at least 3 feet below the final finished grade or at least 2 feet below base of rail whichever is lower, unless otherwise specified by the Railroad.

E. All debris and refuse resulting from the work shall be removed from the right of way by the contractor and the premises left in a neat and presentable condition.

F. The work progress shall be reviewed and logged by the Contractor's Engineer. Should an unplanned event occur, the Contractor shall inform the Railroad and submit procedure to correct or remedy the occurrence.

G. Preferably all demolition and beam removal shall be from above. In the case that the beams require removal from below, the beams may temporarily straddle the tracks. The following steps shall be taken:

1) The work shall be scheduled with the Railroad's Service Unit Superintendent subject to the Railroad's operational requirements for continuos train operations. The beams removed in sufficient time for train passage.

2) The tracks shall be protected and no equipment placed on the tracks.

3) The beams shall be blocked and not come in contact with the tracks. Blocking shall not be placed on the tracks.

4) The beams and all equipment will be moved a minimum of 15 feet from the nearest rail of the tracks when a train is passing.

## IV. TRACK PROTECTION

A. The track protective cover shall be constructed before beginning bridge removal work and may be supported by falsework or members of the existing structure. See the attached Track Shield Detail and Frame Protection Detail for additional requirements. Types of protective covers that may be acceptable methods for protecting the tracks are:

1) A decking supported by the bridge or a suspended cover from the bridge above the track clearance envelope.

2) A track shield cover over the tracks per the attached detail.

3) A framed cover outside the track clearance envelope.

4) A catcher box or loader bucket under decking and parapets overhanging the exterior girders.

B. Construction equipment shall not be placed on the tracks unless tracks are protected.

C. Temporary haul road crossings shall are of either Section Timbers or Precast Concrete Panels. The type of crossing shall be determined by the Manager of Industry and Public Projects. Solid timbers or ballast with timber headers shall be used between multiple tracks. If temporary crossing is accessible to public crossing shall be protected with barricades or locked gates when contractor is not actively working at the site or weekends.

D. Track protection is required for all equipment including rubber tired equipment operating within 25 ft. or over the tracks.

## V. CRANES

A. When cranes are operated near the tracks the following is required:

1) Only cranes with the capacity to handle the loads may be used. Front end loaders and backhoes cannot be used to lift over the tracks.

2) The Contractor shall verify that the foundations under the crane can support the loads.

3) The size and material type of crane mats shall be submitted to the Railroad for review and comment. No mat substitution will be allowed. The mats shall be rigid and of sufficient capacity to distribute the crane loads and prevent tipping of the crane.

4) Installation of temporary track crossings for equipment shall be scheduled with the Manager of Industry and Public Projects .

5) Additional track protection is required when crossing with a crane. The protection methods shall be submitted to the Railroad for review and comment.

6) Equipment shall not place outriggers on the tracks or ballast.

7) Cranes shall not be placed within the track clearance envelope without flagman protection.

## VI. CUTTING TORCHES

A. When a cutting torch is used near the tracks or any timber, the following steps shall be taken:

1) Fire suppression equipment is required on-site.

2) Do not use a torch over, between, or adjacent to the tracks unless a steel plate protective cover is used. Care shall be taken to make certain the use of a steel plate does not come in contact with the rails. See "Track Shield Details" for other requirements. Details of the shield shall be submitted to the Railroad for approval..

3) Wet the ties and other timber below the cutting area.

4) Monitor the work site for at least three hours after cutting for a smoldering fire.

B. Extensive overhead cutting will not be performed over the track area without the proper fire suppression equipment on-site and proper protection.

## VII. UTILITIES

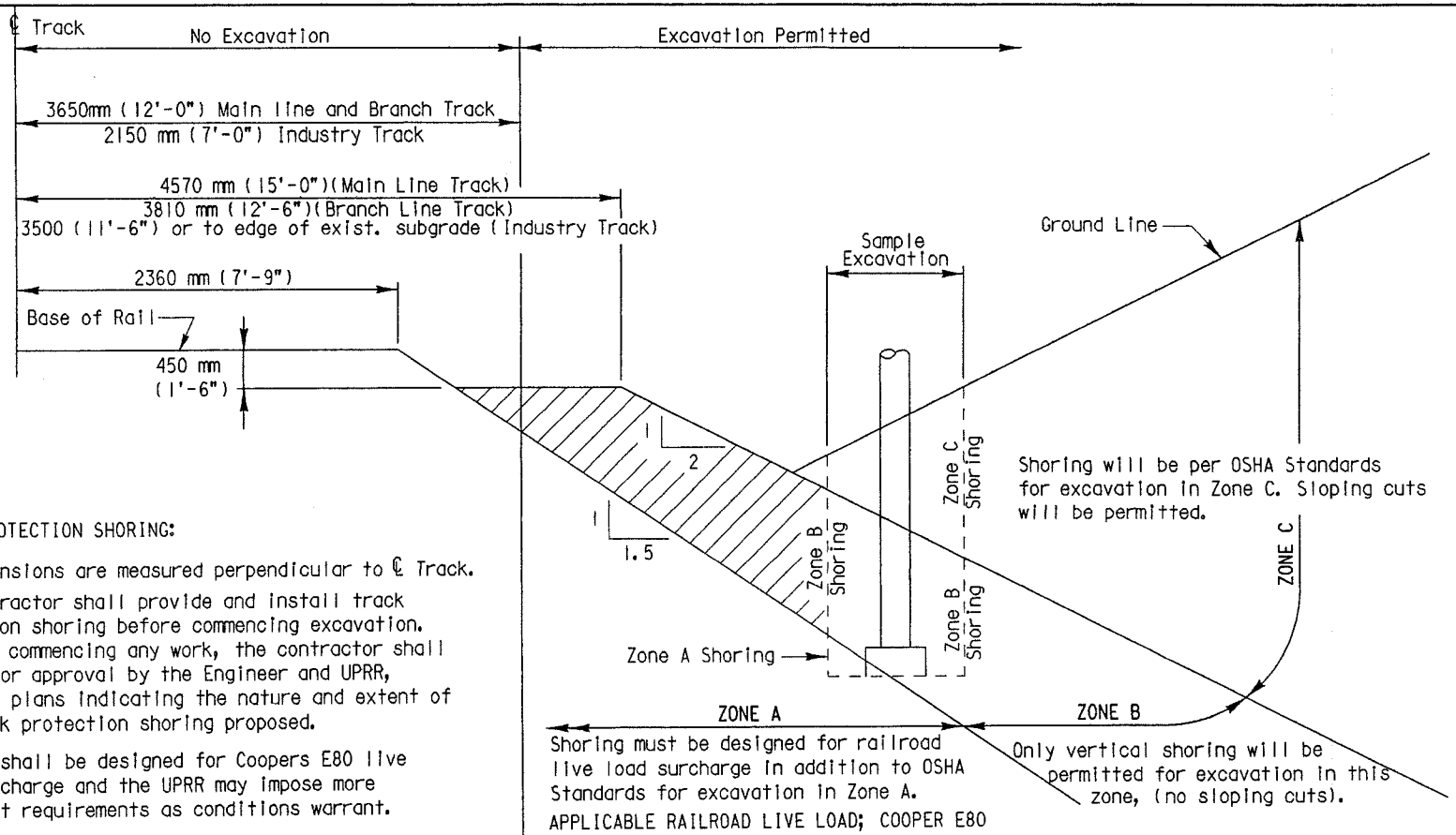
A. The demolition operations shall be planned such that the utility lines are operating safely at all times. The utility lines shall be protected if affected by demolition operations. All the work associated with utility lines should be coordinated by the contractor with the respective utility companies.

## VIII. HAZARDOUS MATERIAL

A. If any hazardous materials are found, provide material protection as specified in local hazardous material codes and immediately contact the Railroad.

# APPENDIX

- U.P.R.R. STANDARD DRAWING 106613
- TRACK SHIELD DETAIL
- FRAME PROTECTION DETAILS




APPLICABLE RAILROAD LIVE LOAD; COOPER E80

TRACK PROTECTION SHORING REQUIREMENTS

TRACK PROTECTION SHORING:

All dimensions are measured perpendicular to ℄ Track.

The contractor shall provide and install track protection shoring before commencing excavation. Prior to commencing any work, the contractor shall submit for approval by the Engineer and UPRR, detailed plans indicating the nature and extent of the track protection shoring proposed.

Shoring shall be designed for Coopers E80 live load surcharge and the UPRR may impose more stringent requirements as conditions warrant.

For excavations which encroach into railroad live load surcharge zone, shoring plans will be accompanied by a copy of the design calculations, and both must be stamped by a registered professional engineer.

Design of shoring shall comply with UPRR guidelines for design and construction of shoring adjacent to active railroad tracks.

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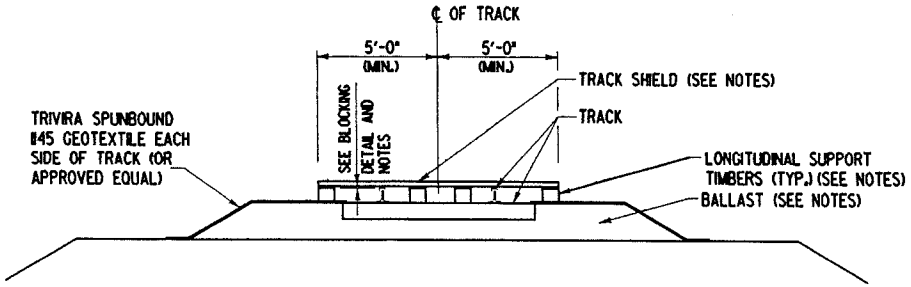
GENERAL SHORING REQUIREMENTS

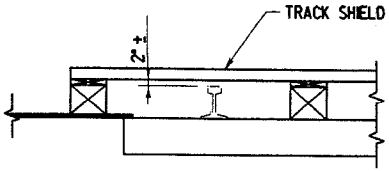
OFFICE OF CHIEF ENGINEER DESIGN

DATE: 3-31-98 REDRAWN

C.E. 106613




## TRACK SHIELD DETAIL
## FOR DEBRIS FALLING FROM BRIDGE DECK REMOVAL
## (WHEN TRACK TIME WINDOW IS AVAILABLE)




## BLOCKING DETAIL

NOTES:

1. A FLAGMAN IS REQUIRED AT ALL TIMES DURING THE USE OF A TRACK SHIELD.
2. THE TRACK SHIELD SHALL BE DESIGNED BY THE CONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOADS, INCLUDING IMPACT. THE SHIELD SHALL PREVENT ANY MATERIALS, EQUIPMENT OR DEBRIS FROM FALLING ONTO THE RAILROAD TRACK. ADDITIONAL LAYERS OF MATERIALS SHALL BE FURNISHED AS NECESSARY TO PREVENT FINE MATERIALS OR DEBRIS FROM SIFTING DOWN UPON THE TRACK.
3. THE SHIELD SHOULD PREFERABLY BE PREFABRICATED AND FURNISHED WITH LIFTING HOOKS TO SIMPLIFY REMOVAL.
4. THE SHIELD SHALL BE OF SUFFICIENT STRENGTH TO SPAN BETWEEN IT'S SUPPORTS WITHOUT BEARING UPON THE RAILS AND TO WITHSTAND DROPPING RUBBLE.
5. BEFORE REMOVAL, THE SHIELD SHALL BE CLEANED OF ALL DEBRIS AND FINE MATERIAL.
6. THE TRACK SHIELD SHALL EXTEND AT LEAST 20 FEET BEYOND THE LIMITS OF DEMOLITION TRANSVERSE TO THE EDGE OF THE BRIDGE.
7. LONGITUDINAL SUPPORT TIMBERS FOR THE SHIELD SHALL NOT EXTEND ABOVE THE TOP OF RAIL WHEN THE SHIELD IS REMOVED. BLOCKING FROM THE TOP OF RAIL TO THE BOTTOM OF THE SHIELD MAY BE ATTACHED TO THE SHIELD. REMAINING TIMBERS SHALL BE ANCHORED.
8. FOR TRAIN PASSAGE, THE RUBBLE SHALL BE REMOVED TO A MINIMUM OF 8' 6" FROM THE NEAREST RAIL AND TO AN ELEVATION NO HIGHER THAN THE TOP OF RAIL.
9. AT THE END OF THE DAY, THE RUBBLE SHALL BE REMOVED COMPLETELY TO A MINIMUM OF 10' 0" FROM THE NEAREST RAIL AND DOWN TO ORIGINAL GRADE.
10. CARE SHALL BE TAKEN TO NOT PLACE METAL ACROSS THE TRACK RAILS. RAILROAD COMMUNICATIONS ARE SENT THROUGH THE RAILS AND WILL BE DISRUPTED BY A SHORT BETWEEN RAILS.
11. DETAILS SHOWN APPLY FOR TIMBER TIES. SPECIAL DETAILS ARE REQUIRED FOR CONCRETE TIES.

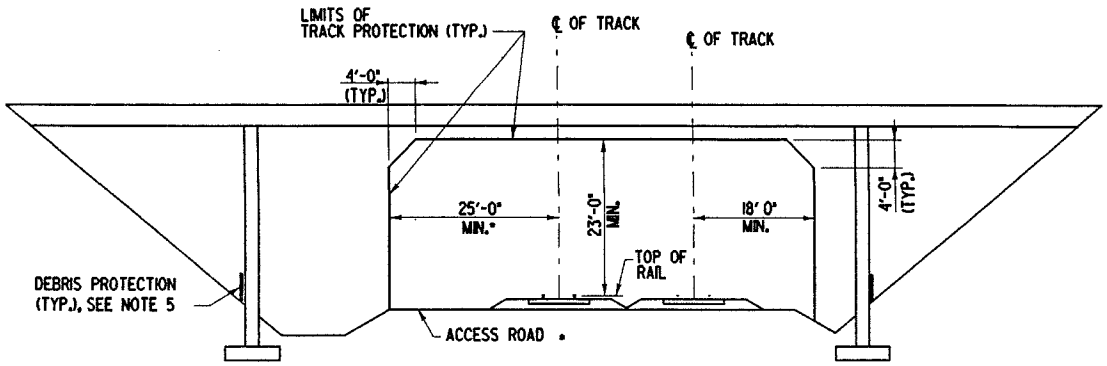
UNION PACIFIC RAILROAD

TRACK SHIELD DETAIL

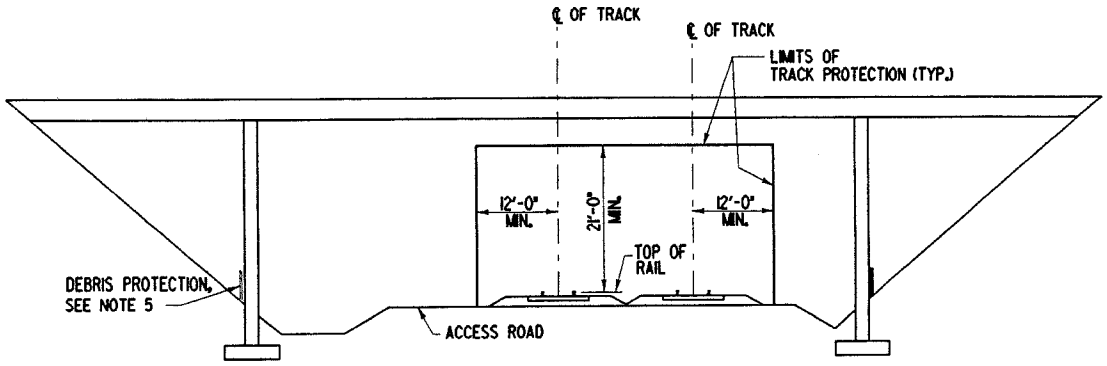
OFFICE OF CHIEF ENGINEER DESIGN

DATE: 3-31-98

SHEET 1 OF 1




**BRIDGE ELEVATION**
**STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION**




**BRIDGE ELEVATION**
**MINIMUM LIMITS OF PROTECTION FOR FRAME PROTECTION**
**(SPECIAL PERMISSION REQUIRED, SEE NOTE 1)**

* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL.

NOTES:

1. THE STANDARD LIMITS OF PROTECTION NOTED ARE THE MIN. CLEARANCES ALLOWED WITHOUT SPECIAL PERMISSION FROM THE RAILROAD. THE REDUCED CLEARANCES NOTED MAY BE ALLOWED BY THE RAILROAD. SPECIAL PERMISSION FOR THE REDUCED CLEARANCES IS REQUIRED FROM THE RAILROAD SERVICE UNIT SUPERINTENDENT.
2. THE PROTECTION FRAME SHALL AS A MINIMUM MATCH THE DEMOLITION LIMITS SHOWN AND EXTEND PAST THE BRIDGE WIDTH AS SHOWN ON THE ATTACHED DEMOLITION PLAN SHEET.
3. FOR ADDITIONAL CLEARANCE AND PROTECTION INFORMATION, SEE UNION PACIFIC RAILROAD STANDARD DRAWING NO. 0035
4. THE PROTECTION FRAME SHALL PREVENT DEMOLITION DEBRIS, DUST AND FINE MATERIAL FROM FALLING ONTO THE RAILROAD TRACKS, ACCESS ROAD OR TRAINS. THE FRAME SHALL BE DESIGNED BY THE CONTRACTOR TO SUPPORT THE ANTICIPATED DEMOLITION LOADS, AND IN ACCORDANCE WITH UNION PACIFIC GUIDELINES FOR DESIGN OF FALSEWORK FOR STRUCTURES OVER THE RAILROAD.
5. DEBRIS PROTECTION IS REQUIRED NEAR THE BASE OF THE SIDE SLOPES AND ADJACENT TO ROADS USED BY DEMOLITION EQUIPMENT TO PREVENT DEBRIS FROM ROLLING ONTO THE TRACK, ACCESS ROAD OR DITCH. USE TIMBERS AS REQUIRED TO STOP LARGE PIECES OF ROLLING DEBRIS.
6. ANY ACTIVITY WITHIN 25 FEET OF THE NEAREST RAIL OF A TRACK REQUIRES A FLAGMAN.

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FRAME PROTECTION DETAILS

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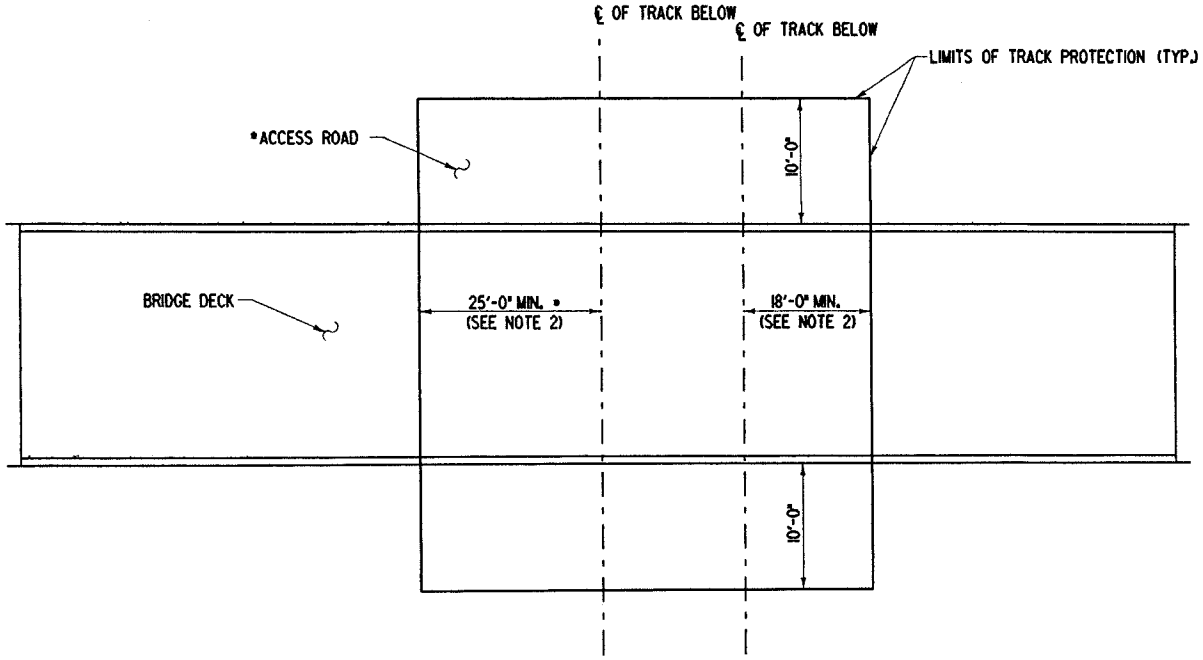
SHEET 1 OF 2

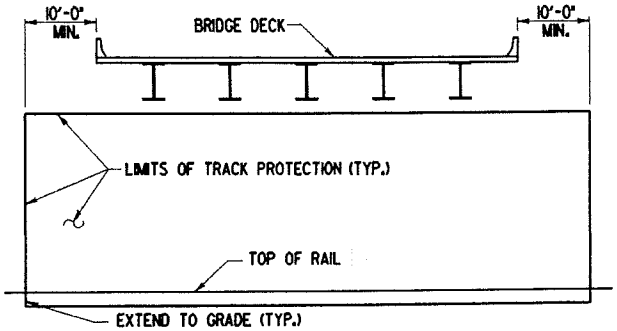



**BRIDGE PLAN**
**STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION**

* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE

NOTES:

1. SEE GENERAL NOTES ON BRIDGE ELEVATION SHEET
2. STANDARD LIMITS OF PROTECTION ARE SHOWN. FOR MIN. LIMITS OF PROTECTION DIMENSIONS, SEE BRIDGE ELEVATION, MINIMUM LIMITS OF PROTECTION.




**BRIDGE DECK CROSS SECTION**
**STANDARD LIMITS OF PROTECTION**

* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE

UNION PACIFIC RAILROAD

FRAME PROTECTION DETAILS

OFFICE OF CHIEF ENGINEER DESIGN

DATE: 3-31-98

SHEET 2 OF 2