

**IOWA DEPARTMENT OF TRANSPORTATION**

To Office	Bridges and Structures	Date	March 24, 2005
Attention	All Employees	Ref No.	521.1
From	Gary Novey		
Office	Bridges and Structures		
Subject	Method's Memo No. 91 (Temporary Shoring Adjacent to Roadway)		

Recent questions have been raised about the use of shoring and when it should be required during construction. If shoring is required, when should the plans specify the shoring be designed and sealed by a professional engineer? To help clarify the use of shoring the following guidelines using zones of excavation have been adopted. See also Figure 1. "Temporary Shoring Excavation Classification Line" for details of the temporary shoring limits and zones.

Zone 1: If room is available for the contractor to temporarily slope the embankment back from the edge of shoulder at a minimum slope of 1.5 to 1, then no submittal for shoring is required. For situations where traffic is shifted to the shoulders, consideration should be given to shoring or slope stability. The temporary slope of 1.5:1 is limited to heights of less than 20 ft. (6000 mm) unless a global stability analysis is performed.

Zone 2: When excavation less than 5 ft. (1500 mm) is required adjacent to the roadway, shoring shall be provided by the contractor. Shoring plans will be the responsibility of the contractor and shall be submitted for approval. Plan note E171 shall be used. The degree of formal review will be at the judgment of the RCE.

Zone 3: When excavation 5 ft. (1500 mm) and more is required adjacent to the roadway, shoring shall be required and a professional engineer shall seal the design. The department will review the design and details for approval. Plan note E172 shall be used. The Lump Sum "Temporary Shoring" bid item shall be used.

Also see plan notes E171 and E172 below and a flow chart for the approval process.

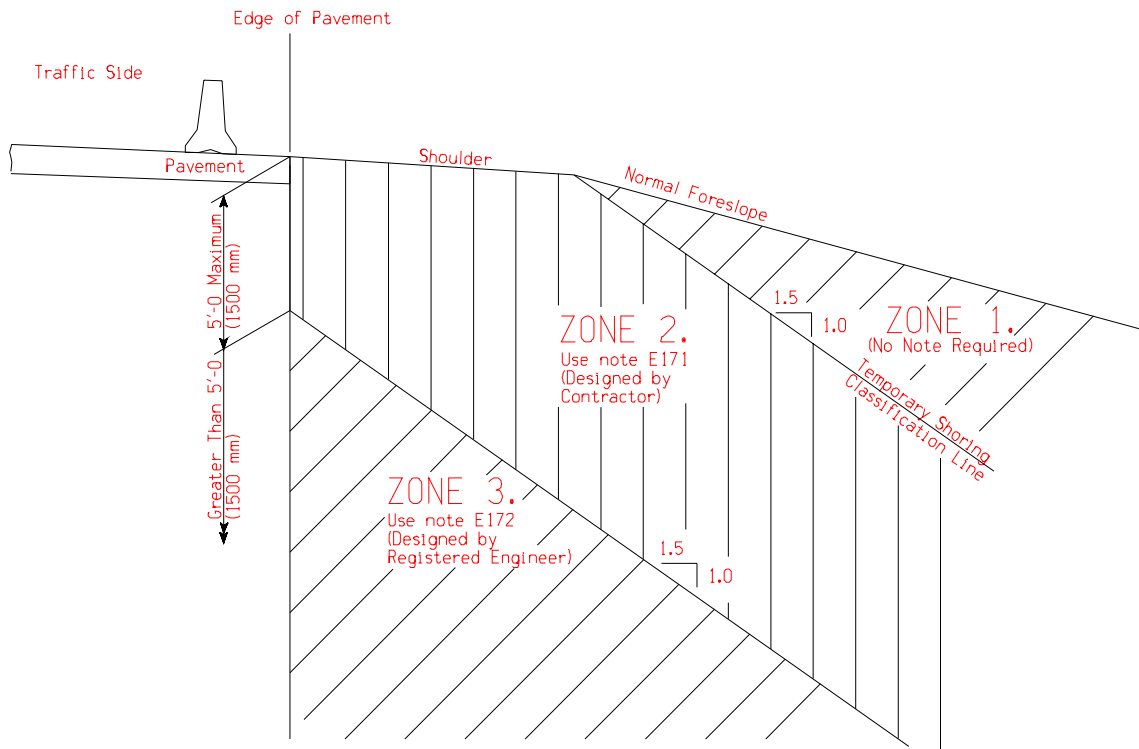


Figure 1. Temporary Shoring Excavation Classification Line

### E171/M171: Earth retention, temporary shoring

THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING (SHEET PILE OR OTHER) TO PREVENT THE EARTH UNDER THE TRAFFIC LANE, FROM SLOUGHING IN DURING CONSTRUCTION. ALL COST OF SHORING, WILL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND NO DIRECT PAYMENT WILL BE MADE. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED. THE CONTRACTOR SHALL SUBMIT SHORING PLANS FOR REVIEW.

Use this note when excavation in Zone 2. is required.

Staged construction may require excavation very close to a traffic lane and temporary embankment support (shoring) may be necessary to safely maintain traffic. The plans shall require the Contractor to provide adequate shoring and the details shall be reviewed and approved by the Engineer.

This note will need to be modified to accommodate specific job situations such as type of structure, embankment location, etc.

For situations where traffic is shifted to the shoulders, consideration should be given to shoring or slope stability. The temporary slope of 1.5:1 is limited to fill heights of less than 20 ft. (6 m) unless a global stability analysis is performed.

**E172/M172: Earth retention, temporary shoring, PE required**

TEMPORARY SHORING (SHEET PILE OR OTHER) SHALL BE REQUIRED AS NECESSARY TO PREVENT THE EARTH UNDER THE TRAFFIC LANE FROM SLOUGHING IN DURING CONSTRUCTION.

THE CONTRACTOR SHALL SUBMIT A TEMPORARY SHORING PLAN TO THE ENGINEER FOR APPROVAL. THE TEMPORARY SHORING PLAN SHALL BE DESIGNED AND CERTIFIED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF IOWA. THE CONTRACTOR SHALL SUBMIT 6 COPIES OF PLANS FOR TEMPORARY SHORING. THE ENGINEER WILL BE ALLOWED 30 CALENDAR DAYS TO REVIEW THE TEMPORARY SHORING PLAN. THE CONTRACTOR SHALL NOT PROCEED WITH INSTALLATION OF THE TEMPORARY SHORING WITHOUT NOTICE TO PROCEED FROM THE ENGINEER.

THE TEMPORARY SHORING SUBMITTAL SHALL INCLUDE:

- DESIGN CALCULATIONS (INCLUDING A GLOBAL STABILITY ANALYSIS)
- SOIL PROPERTIES
- SHORING MATERIAL PROPERTIES
- SHORING PLAN LAYOUT (SHOWING LOCATION OF TRAFFIC)
- SHORING DETAILS

TEMPORARY SHORING SHALL BE PAID FOR AS A LUMP SUM INCLUDING ALL COST FOR DESIGNING, FURNISHING, INSTALLING AND REMOVAL. ALL MATERIAL USED FOR SHORING SHALL REMAIN THE PROPERTY OF THE CONTRACTOR. SHORING IS TO BE REMOVED ONLY AFTER BACKFILLING HAS BEEN COMPLETED.

Use this note when excavation is in Zone 3. The following lump sum bid item are to be used for temporary shoring when note E172 is used.

2501-8400172	Temporary Shoring	LS	(English)
2501--321011	Temporary Shoring	LS	(Metric)

The contractor will be paid a lump sum contract price for temporary shoring. This payment shall be full compensation for all costs associated with designing, furnishing, installing and removing the temporary shoring.

Design and review of the temporary shoring is based on the AASHTO Guide Design Specification for Bridge Temporary Works.

The Design Office, Soils Section, should be the first to review the temporary shoring plans submitted. The Soils Section will review the contractor's soils assumption and the applied load generated. The Office of Bridges and Structures will then review the shoring system to verify the loads do not exceed the allowable stresses on the temporary shoring system and will check for adequacy of the details. See figure 2 for a flowchart of the temporary shoring plan review.

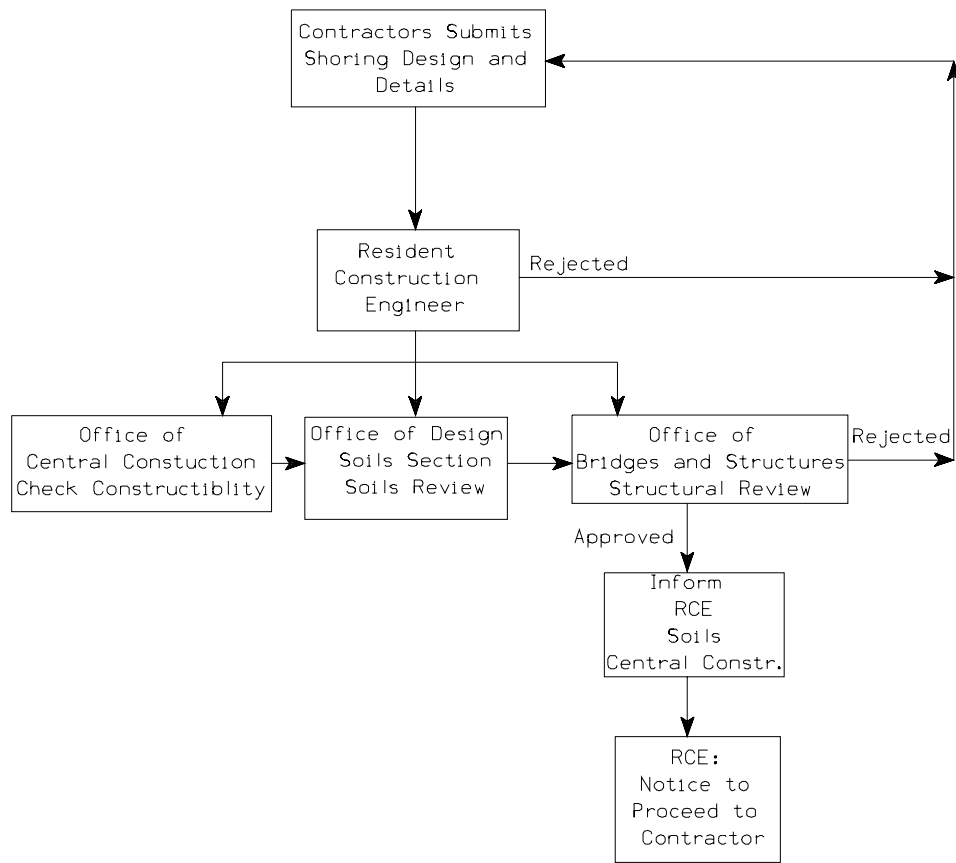


Figure 2 - Temporary Shoring Plan Review Flowchart for Zone 3. approval

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