

MTS/SDA&E EXCAVATION SUPPORT SYSTEMS REQUIREMENTS

A-1 GENERAL

This Section specifies procedures, performance criteria and requirements for providing safe and stable excavations throughout construction. Provide temporary sheeting, shoring and bracing systems as required by the Work. Meet all codes, regulations, and requirements of agencies having jurisdiction over this Work. Obtain all required Federal OSHA, Cal/ OSHA and local jurisdiction permits.

Work under this Section, shall include but shall not be limited to:

- A. Design of the temporary support systems
- B. Construction of temporary sheeting, shoring, and bracing systems
- C. Employing acceptable side slope layback methods for excavations
- D. Maintenance of bracing systems and removal
- E. All associated design Work

A-2 SUBMITTALS

General Excavation Support Procedure: Submit an outline of intended excavation support systems and associated installation and removal procedures as required for the Work. This submittal is for the Engineer's general information and in no way relieves the Contractor of complete responsibility for the successful performance of his intended excavation methods.

Sheeting and/or Shoring Drawings: Required for sheeting, shoring and other excavation support systems, and conforming to the following requirements:

- 1. Drawings shall be prepared, signed and sealed by a Professional Engineer licensed to practice in the State of California.
- 2. Include plan views indicating the extents of all proposed shoring relative to the nearest track centerline.
- 3. Include cross-sections of all proposed shoring.
- 4. Include cross-sections cut perpendicular to the track; indicate the track location relative to the support system and use equal horizontal and vertical scales.
- 5. Vertical dimensions shall be relative to top of rail and horizontal elevations shall be relative to the nearest track centerline.
- 6. Drawings shall also indicate details of all structural members, connection details, and embedment depths.
- 7. Indicate construction access locations.

Design Calculations: Required for sheeting, shoring and other excavation support systems; prepared, signed, and sealed by a Professional Engineer licensed to practice in the State of California.

A-3 DESIGN CRITERIA

Design the excavation support in accordance with AASHTO and AREMA requirements, to support all loads including: earth pressures, AASHTO HS20 traffic loading, AREMA Cooper E-80 Railroad Loading, utility loads, loads from adjacent structures, ground water pressure, and equipment and construction loads. No increases in allowable stresses or reductions of safety factors shall be allowed.

The excavation support shall allow safe and expeditious construction of the permanent structure without movement or settlement of adjacent buildings, structures, utilities, or track work.

Excavations and shoring systems shall be such that AREMA Cooper E-80 Loading can be accommodated at all times during the shoring construction. Shoring construction shall be performed without affecting railroad operations unless otherwise approved in advance by the Engineer.

Temporary sheeting and shoring for support of adjacent tracks during construction shall not be closer than 8'-6" from the nearest track centerline (refer to CPUC G026-D and 118).

Excavation and Shoring requirements within the Sheet Piling Zone: The Sheet Piling Zone shall be defined as the area between the following boundaries:

A vertical line offset 8'-6" from the nearest track centerline

A 1:1 projection beginning at a point located 8'-6" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1:1 projection shall slope down and away from the nearest track.

Un-shored excavations within the Sheet Piling Zone shall not be allowed. Shoring within the Sheet Piling Zone shall be of a type where the shoring is installed in place prior to any excavation being performed, and where the excavation can be made with no possibility of disturbance or loss of soil material retained between the shoring and the track. Common shoring types fulfilling this requirement are interlocking-edge sheet piling, tongue and groove edge precast concrete sheet piling, which are driven or vibrated in position prior to starting any excavation. Unless otherwise indicated in the Project Specific Specifications, on the plans, or as approved by the Engineer, shoring within the Sheet Piling Zone shall be abandoned in place, except for the top 2 feet, which shall be removed, and backfilled in accordance with these specifications. Shoring types using lagging elements, which are placed as excavation proceeds, are not permitted within the Sheet Piling Zone. Shoring within the Sheet Piling Zone shall be designed for AREMA Cooper E-80 Loading.

Excavation and Shoring requirements within the Shoring Zone: The Shoring Zone shall be defined as the area between the following boundaries:

A 1:1 projection beginning at a point located 8'-6" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1:1 projection shall slope down and away from the nearest track.

A 1.5:1 projection beginning at a point located 11'-0" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1.5:1 projection shall slope down and away from the nearest track.

Un-shored excavations within the Shoring Zone shall not be allowed. Shoring types using lagging elements, which are placed, as excavation proceeds are allowable within the Shoring Zone. Shoring within the Shoring Zone shall be designed for AREMA Cooper E-80 Loading.

Excavation and Shoring requirements within the Excavation Zone: The Excavation Zone shall be defined as the area that is located beyond (i.e. in a direction away from the nearest track) the following boundary:

A 1.5:1 projection beginning at a point located 11'-0" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1.5:1 projection shall slope down and away from the nearest track.

Sloping cuts are allowed within the Excavation Zone. Excavations and shoring within the Excavation Zone are not required to be designed for railroad live loading.

Provide handrails in accordance with Cal-OSHA and CPUC General Order 26-D.

Tiebacks or any other excavation support mechanisms that are installed under the track structure shall be at least 24 inches clear below top of rail.