

SECTION 02300A

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Furnish all labor, materials, professional services, and accessories for temporary excavation support and protection work.
- B. Related Work In Other Sections
 - 1. Coordinate this work with SECTION 02300 - EARTHWORK.

1.2 CODES AND STANDARDS:

- A. OSHA 29 CFR 1926.
- B. BNL Standards-Based Management System; ES&H Standards (SBMS).
- C. American Society for Testing and Materials.
- D. National Electric Code.

1.3 PERFORMANCE REQUIREMENTS:

- A. Design, provide, monitor, and maintain an anchored and braced excavation support and protection system capable of resisting soil and hydrostatic pressure and superimposed construction loads, and supporting sidewalls of excavations.
 - 1. Provide professional engineering services needed to assure engineering responsibility.
 - 2. Work includes removing excavation support and protection systems when no longer needed.
 - 3. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 4. Install excavation support and protection systems without damaging existing buildings, pavements, and other improvements adjacent to excavation.
 - 5. Supervision shall be provided by the support and protection contractor's "Competent Person" as defined in 29 CFR 1926.650.
 - 6. No excavation support work may proceed until MPO issues the proper Digging Permit.

1.4 SUBMITTALS:

- A. Shop Drawings:
 - 1. Prepared by or under the supervision of a qualified professional engineer for excavation support and protection systems. System design, calculations, and comprehensive engineering analysis must be acceptable to MPO.

2. Include Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

B. Qualification Data:

1. For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Photographs or Videotape:

1. Sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by excavation support and protection systems.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications:

1. Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing excavation support and protection systems similar to those required for this Project and with a record of successful in-service performance.

B. Professional Engineer Qualifications:

1. A professional engineer who is legally qualified to practice in the State of New York and who is experienced in providing engineering services for designing excavation support and protection systems that are similar to those indicated for this Project in material, design, and extent.
2. Engineering Responsibility:
 - a. Engage a qualified professional engineer to prepare or supervise the preparation of data for the excavation support and protection system including drawings and comprehensive engineering analysis that shows the system's compliance with specified requirements.

1.6 PROJECT CONDITIONS:

A. Existing Utilities:

1. Do not interrupt utilities serving facilities occupied by BNL or others unless permitted in writing by MPO, and then only after arranging to provide temporary utility services according to requirements indicated.

B. Project Site Information:

1. A geotechnical report has been prepared for this Project and is available for information only. The report is not part of the Contract Documents. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of the subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. BNL will not be responsible for interpretations or conclusions drawn from this data by Contractor.
2. Make additional test borings and conduct other exploratory operations as necessary.

- C. Survey adjacent structures and improvements, employing a qualified professional engineer or surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify MPO if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 PRODUCTS:

2.1 MATERIALS

- A. Materials need not be new but must be in serviceable condition.
- B. Structural Steel: ASTM A 36 (ASTM A 36M).
- C. Steel Sheet Piling: ASTM A 328 (ASTM A 328M) or ASTM A 572 (ASTM A 572M), with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 3 inches (75 mm).

PART 3 EXECUTION:

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from MPO. Provide alternate routes around closed or obstructed traffic ways where required.
- C. If system location is in areas of overhead electric lines, clearance requirements shall be as defined in Article 100 of the National Electric Code.
- D. Locate excavation support and protection systems clear of permanent construction and to permit forming and finishing of concrete surfaces.
- E. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure excavation support and protection systems remain stable.

- F. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER BEAMS AND LAGGING:

- A. Install steel soldier piles before starting excavation. Space soldier piles at intervals indicated. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at centers indicated and secure to soldier piles.

3.3 SHEET PILING:

- A. Install one-piece sheet piling and tightly interlock to form a continuous barrier. Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS:

- A. Drill for, install, tension, and grout tiebacks into position. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

3.5 BRACING:

- A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by BNL.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 REMOVAL AND REPAIRS:

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and damaging structures, pavements, facilities, and utilities.
 - 1. Repair or replace, as approved by MPO, adjacent work damaged or displaced by removing excavation support and protection systems.

- B. Only leave excavation support and protection systems permanently in place when specifically approved by BNL.

END OF SECTION

Revision History	
Date	Rev. No.
04-08-09	0

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