



Earthwork – Structure Excavation and Backfill – Construction – Structure Excavation

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	12-31-2020	Original Issue	Richard Foley

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Background

This process establishes Structure Construction (SC) responsibilities and procedures for structure excavation work, for typical excavations, soldier pile walls, pier columns, and cofferdams, including the construction of protective systems required per [BCM 7-1.02K\(6\)\(b\)](#), *Legal Relations and Responsibility to the Public - Occupational Safety and Health Standards – Excavation Safety*. The end of this process concludes with the acceptance of completed structure excavations.

Additional unique requirements related to this process are detailed in:

- [BCM 19-3.03B\(5\)](#), *Earthwork – Structure Excavation and Backfill – Construction – Structure Excavation – Water Control and Foundation Treatment*.
- [BCM 19-3.03K](#), *Earthwork – Structure Excavation and Backfill – Ground Anchor and Soil Nail Walls*.

It is important for SC personnel to have all necessary authorized submittals required for worker and facility protection prior to the start of structure excavation work to best assure the safe performance of structure excavation.

Prior to reviewing this Bridge Construction Memo (BCM), it is essential to review the contract specifications 19-3.03B, *Earthwork – Structure Excavation and Backfill – Construction – Structure Excavation*, that this BCM is based on as identified in the title

block above. The information in the contract specifications typically will not be repeated in the text of this BCM.

Process Inputs

1. The start of structure excavation work.
2. The contractor's Underground Service Alert (USA) notice to begin excavation.

Procedure

1. All work associated with this process is charged as [Project Direct – Construction](#).
2. Field work for this process is:
 - a. [Intermittent](#) inspection for structure excavation work and installation of protective systems.
 - b. [Continuous](#) inspection for structure excavation work and installation of protective systems if public safety or preservation of property is a concern, or when a change order (CO) is required for buried man-made objects or unsuitable material.
3. Before construction begins:
 - a. Review all authorized submittals per BCM 7-1.02K(6)(b), *Legal Relations and Responsibility to the Public – Occupational Safety and Health Standards – Excavation Safety*, and [BCM 19-3.01C](#), *Earthwork – Structure Excavation and Backfill – Submittals*
 - b. Review the Geotechnical Design Report (GDR) and/or the Final Foundation Report (FFR), which includes foundation recommendations, settlement requirements, and the Geotechnical Services contact.
 - c. Review the Resident Engineer (RE) pending file for the:
 1. Engineer's Estimate quantity calculations for anomalies.
 2. Project Risk Register for excavation risks such as buried man-made objects or unsuitable material.
 - d. Discuss with the contractor:
 - i. Timely notification of Underground Service Alert (USA). Request a copy.
 - ii. The competent person(s) for excavation as defined in the *California Code of Regulations (CCR)*, Title 8, Chapter 4, Subchapter 4, *Construction Safety Orders*, [Article 6](#), *Excavations*. See §1541, *General Requirements*, (b)(1)(C) for a definition of "the competent person" responsible for monitoring excavation operations.

- iii. The requirements of the contract documents; particularly unique issues such as vibration restrictions and handling of contaminated (or potentially contaminated) soil.
 - iv. Timely request of quantity adjustments (if needed) prior to performing extra work.
4. During construction:
- a. For all structure excavation work:
 - i. Inspect and evaluate structure excavation work in progress:
 - 1. Verify the field conditions match the authorized submittals assumptions and the contractor's method or materials are as planned.
 - 2. Verify soil types/classifications encountered during structure excavation work match the assumed conditions in the authorized earthwork submittals and/or Contract Documents using:
 - a. Inspection tools such as a pocket penetrometer or Torvane can be useful for verifying soil conditions; see Appendix A, *Field Test Procedures*, of the [Soil and Rock Logging, Classification, and Presentation Manual](#) for additional information.
 - b. Geotechnical Services to assist with the classification of the in-situ materials if needed.
 - c. Additional information contained in the [Trenching and Shoring Manual](#), Sections 2.2.3, *Soil Classification*; 3.1, *Soil Identification, Classification, Description and Presentation*, and Appendix A, excerpts of *California Occupational Safety and Health Standards for Excavations* (see Soil Classification on page A-19).
 - 3. Inspection of excavations where water is present requires additional precautions. See Cal/OSHA requirements under CCR, Title 8, Chapter 4, Subchapter 4, *Construction Safety Orders*, Article 6, *Excavations § 1541, General Requirements (h), Protection from hazards associated with water accumulation*, and BCM 19-3.03B(5), *Earthwork – Structure Excavation and Backfill – Construction – Structure Excavation – Water Control and Foundation Treatment*.
 - 4. Follow [BCM 19-1.03D](#), *Earthwork – General – Construction – Buried Manmade Objects*, if buried man-made objects are encountered.
 - ii. Verify that the contractor's competent person is inspecting the site in accordance with the Construction Safety Orders and the authorized excavation plan.

- iii. Require resubmittal for any deviations encountered during structure excavation work of the authorized submittals, including assumed soil types/classifications.
 - iv. Determine whether the depth of the structure excavation needs to be changed from that shown in the contract documents. See [BCM 19-3.01A](#), *Earthwork - Structure Excavation and Backfill – Summary*, and [BCM 51-1.03C-D](#), *Concrete Structures – General – Preparation and Placing Concrete*. Authorize change order work if needed. See [BCM 19-1.03B](#), *Earthwork – General – Construction – Unsuitable Material*:
 - 1. Contact Geotechnical Services as needed for assistance in determining the soil at the planned footing elevations or with identification of unsuitable materials.
 - v. Accept structure excavation work, upon satisfactory inspection of foundation material at planned footing elevation, by letter to the contractor.
- b. For Soldier Pile Walls:
- i. Confirm excavation and construction of soldier pile walls meets the requirements of the contract documents and the authorized shop drawings.
 - ii. Evaluate whether boulders that interfere with lagging need to be removed and authorize change order work if needed.
- c. For Pier Columns:
- i. Review requirements for excavation work for pier columns contained within the contract Special Provisions.
 - ii. Confirm excavation and bracing used to support the pier column excavation meet the requirements of the contract documents. See [Foundation Manual](#), Chapter 10, *Pier Columns*.
- d. For Cofferdams:
- i. Confirm construction of the cofferdam meets the requirements of the contract documents and the authorized shop drawings.
 - ii. Refer to [BCM 19-3.03B\(5\)](#), *Earthwork – Structure Excavation and Backfill – Construction – Structure Excavation – Water Control and Foundation Treatment*.
5. Document all inspection, construction, and quality assurance activities, pertinent to this BCM, in the daily reports per [BCM C-7](#), *Daily and Weekly Reports*.
6. File all test results and daily reports in the appropriate category in the project records as specified in the Construction Manual [Section 5-1.02](#), *Contract*

Administration – Project Records and Reports – Organization of Project Documents.

Process Outputs

1. Daily Reports
2. Authorized change order work ([BCM C-10, Change Orders](#))
3. Accepted structure excavations

Attachments

None