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| REVIEW OF NEW SPECIFICATION OR SPECIFICATION CHANGE  | 206-9 |
| **Specification Section No.:** 206 | **Item:** Shoring |
| **Originating Office:** Materials and Geotechnical | **By:** Thomas/Schiebel |
| **Date Sent For Review:** May 24, 2017 | **Date Comments Due: June 21, 2017** |
| Submit response to: STANDARDS AND SPECIFICATIONS UNIT, DIVISION OF PROJECT SUPPORT 4TH FLOOR, CDOT HEADQUARTERS |
| **Vote****/N** | **Concurrent Reviews – Others Commenting** | The attached Draft Specification is submitted for your review and comments. If not returned by Date Comments Due, the draft specification will be considered to be approved unless the Standards and Specifications Unit of the Project Development Branch [(303) 757-9474, (303) 757-9402] is advised otherwise.**REMARKS:** If these proposed modifications are approved, our unit will issue these in a new standard special provision. |
|  | **Spec Committee Members:** |  **✓** |
|  | Co-Chairman: Lacey |  |
|  | Region 1: Quirk |  |
|  | Region 1: Lucerna |  |
|  | Region 2: Phillips |  |
|  | Region 3: Jean |  |
|  | Region 4: Boespflug |  |
|  | Region 5: Valentinelli |  |
|  | Project Development: Vacant |  |
|  | Specifications: Brinck |  |
|  | Bridge: Hasan |  |
|  | Contracts & Market Analysis: Eddy |  |
|  | Materials: Schiebel |  |
|  | Traffic Engineering: Matthews |  | REVIEWER COMMENTS:( ) Approved ( ) Disapproved ( ) ModifiedIf disapproved or modified, give reason why and show any modifications on the attached draft copy: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ Name/Signature Date |
|  | Maintenance: Weldon |  |
|  | FHWA: Larson |  |
|  | Attorney General: Milan |  |
|  |  |  |
|  | **Others:** |  |
|  | Colorado Contractors Assoc.: Moody |  |
|  |  |  |
|  | **Technical Committees:** |  |
|  | PDAC |  |
|  | Drainage Advisory Committee (DAC) |  |
|  | Water Quality Advisory Committee (WQAC) |  |

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| **COLORADO DEPARTMENT OF TRANSPORTATION****SUBMITTAL OF NEW SPECIFICATION OR SPECIFICATION CHANGE** | Log No. (Assigned by Standards and Specifications Unit)206-9 |
| TO: Standards & Specifications Unit Project Development Branch | FROM:Materail Advisory Committee(Region, Branch or Technical Committee) |
| SPECIFICATION SECTION NO.206 | ITEMAll | Priority Routine [x]  Fast [ ]  |
| Reason for this new or changed specification:Distress on temporary shoring for four projects was observed in a 6 month period. This distress caused concerns of failure along safety critical areas requireing unplanned lane closures and delay. The specification was updated to address these safety concerns. |
| New or Revised Specification:The specification has been modified to include additional design and construction requirements, contractor reporting, and structural shoring requirments. The MAC and CCA worked together to revise the specification. The MAC approved of the revision on May 9, 2017. See attached. |
| Note: See Procedural Directive 513.1 for a description of appropriate specification development procedures. |

 **CDOT Form #1215 1/15**

<<date>>

REVISION OF SECTION 206
SHORING

**NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction.* It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by CDOT’s Standards and Specifications Unit. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use on projects having construction shoring.

REVISION OF SECTION 206

SHORING

Delete Sections 206.08, 206.09, 206.10, and 206.11 and replace with the following:

**DESCRIPTION**

**206.08** This work consists of shoring specific areas designated in the Contract.

**MATERIALS AND CONSTRUCTION REQUIREMENTS**

**206.09** The Contractor shall locate, size, design, and construct shoring which provides all necessary rigidity, and supports the loads imposed to facilitate construction as shown on the plans. Shoring used to facilitate construction is considered temporary, shall meet design time requirements, and have a maximum design life up to 3 years.

When the height of shoring exceeds 5 feet above the base of the excavation, the Contractor shall submit working drawings in accordance with Section 105.02, shall be provided by the Contractor to the Engineer for information only. The drawings shall be prepared, signed, and sealed by the Contractor’s Engineer. The Contractor shall design for internal and external stability of temporary shoring such as but not limited to bearing capacity, settlement, sliding, overturning, internal compound stability, and global stability. All proof and verification testing of the shoring elements shall be the responsibility of the Contractor and results shall be reported to the Engineer the day after the testing was performed.

The Contractor shall conduct additional proof and verification testing at the Engineer’s request. Sufficient corrosion protection should be provided in consideration of the temporary shoring design life and is the responsibility of the Contractor. Temporary shoring shall be designed for actual construction-related loads, which can be significantly higher than those assumed in design of temporary structures, such as operation of large cranes or other large equipment near the area of the shoring. These drawings shall be stamped and sealed by the Contractor’s licensed engineer, signed by the Contractor, and provided to the Engineer at least ten days prior to start of work. Shoring construction shall conform with the shoring drawings provided to the Engineer. The Contractor shall conduct any necessary additional shoring site-specific evaluation necessary to ensure shoring design, construction and performance.

If specified for individual shoring locations in the plans, the Contractor shall have performed and documented an independent review of his shoring design and drawings prior to submittal.

The shoring plans shall detail the methods to control site drainage during the life of the shoring. The contractor shall actively control drainage and surface runoff during the duration of construction to direct run off away from the shoring areas above and behind the shoring. A shoring site drainage quality control plan shall be included as part of the Contractor’s Engineer’s shoring plans and shall be part of the submittal to the Engineer. The plan will include measures to prevent ponding water near the shoring area and maintenance of drainage to convey water away from and around the shoring excavation vicinity.

If the embankment, construction, traffic, or any other surcharge is in excess of what the original shoring was designed for and is to be placed adjacent to the shoring, the Contractor shall provide a signed letter from the Contractor’s Engineer prior to the load placement stating that the shoring will support the additional load.

The design for temporary shoring shall include all materials required to construct the shoring including but not limited to soil nails, soil anchors, caissons, piles, grout injection. Shoring shall be designed and constructed in accordance with the requirements listed in this specification along with requirements in current AASHSTO and FHWA design manuals including, but not limited to:

1. AASHTO Construction Handbook For Bridge Temporary Works including Division I
2. Section 5 of the AASHTO Standard Specifications for Highway Bridges for allowable stress or load factor design, or
3. AASHTO LRFD Bridge Design Specifications including current interims for load and resistance factor design.

If a shoring type is to be used that is not detailed in these documents, the shoring type design method will need to be submitted to the Engineer. The Contractor’s Engineer shall be on-site to perform construction inspection during the first two days of active shoring construction, during any required shoring element verification testing, and at the completion of shoring construction. The Contractor’s Engineer may assign a representative by submitting documentation of experience to the Project Engineer 10 days prior to starting shoring construction for review and Project Engineer’s acceptance. Prior to placing construction or traffic loads on or immediately adjacent to the supported earth, the Contractor’s Engineer for the shoring shall certify in a sealed and signed letter that shoring materials and construction have been inspected and that all shoring, materials, and construction are in conformity with the shoring drawings. A copy of this certification shall be submitted to the Project Engineer.

Shoring drawings shall include the following information:

1. The size and grade of all structural materials
2. Design notes, including design assumptions, and construction details
3. Detailed plans for managing and maintaining shoring surface and subsurface drainage conditions for the project duration
4. Where applicable, restrictions on heavy equipment placement at specific locations adjacent to the shoring
5. Areas determined by the Contractor’s Engineer where dewatering of the shored excavation will be required, and a description of the requirements (i.e., head added by the pump, flow rate, minimum pump size, etc.) and methods to be used for dewatering.
6. All other information determined by the Contractor’s Engineer to be pertinent to the design and successful construction of the shoring.

In addition, drawings for temporary shoring that requires structural designs shall include the following information:

1. Individual site-specific geotechnical properties for each shoring location based on the plan, review of the Geotechnical Report in accordance to subsection 102.05, or from a geotechnical evaluation performed by the Contractor at their own expense.
2. Global stability analysis showing that the shoring will be stable under the loads placed on it and construction conditions encountered during construction.

**METHOD OF MEASUREMENT**

**206.10** Shoring will not be measured, but will be paid for as a single lump sum for each Area described on the plans. Incidental shoring work or shoring in locations other than those described on the plans will be as-determined by the Contractor and will not be measured and paid for separately, but shall be included in the cost of the work.

**BASIS OF PAYMENT**

**206.11** The accepted quantities of shoring measured as provided above will be paid for at the contract unit price bid.

Payment will be made under:

**Pay Item Pay Unit**

Shoring (Area \_\_\_\_\_) Lump Sum

Payment for shoring will be full compensation for all labor, materials, and equipment required to design, construct, test, maintain, and dewatering.

Removal of the shoring shall include removal of all shoring elements. The removal area shall be specified in the plans.

Removal of shoring will not be measured and paid for separately, but shall be included in the work.

Other incidental shoring that is not included as a pay item will not be measured and paid for separately, but shall be included in the work.