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| REVIEW OF NEW SPECIFICATION OR SPECIFICATION CHANGE  | 502-4 |
| **Specification Section No.:** 502 | **Item:** Piling |
| **Originating Office:** Bridge | **By:** Far/Howland |
| **Date Sent For Review:** March 27, 2017 | **Date Comments Due: April 10, 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 changes 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)502-4 |
| TO: Standards & Specifications Unit Project Development Branch | FROM:Specification Committee(Region, Branch or Technical Committee) |
| SPECIFICATION SECTION NO.502 | ITEMPiling | Priority Routine [ ]  Fast [x]  |
| Reason for this new or changed specification:-The new foundation designs subject the piles to cyclic loading and higher stresses. -Identify weld inspection parameters by requiring a Certified Welding Inspector to inspect piling welds-Clarify weld type for piling by specifying only partial joint penetration (PJP) or complete joint penetration (CJP) welds.-Specify NDT (Non-Destructive Testing) of CJP splice welds.-Identify qualifications for personnel performing Ultrasonic (UT) testing of CJP welds-Specify payment criteria for PJP and CJP splices-Add bid item for payment of CJP splices |
| New or Revised Specification:See Attached. |
| Note: See Procedural Directive 513.1 for a description of appropriate specification development procedures. |

 **CDOT Form #1215 1/15**

REVISION OF SECTION 502
PILING

Section 502 of the Standard Specifications is hereby revised as follows:

Delete subsection 502.08 and replace with the following:

**502.08** Steel Piling. When the American Welding Society (AWS) D1.1 Structural Welding Code is cited in this revision, it shall be the current edition.

Full length piles shall be used unless otherwise directed. The number of splices shall be kept to a minimum. Commercially available splices may be used if approved.

The splices shall be partial joint penetration (PJP), or complete joint penetration (CJP), as shown on the Plans. Depth of penetration for PJP splices shall be stated on the contract drawings. All welded splices shall be made by using a prequalified joint design in accordance with AWS D1.1. The CJP design shall include beam copes (weld access holes) through the web of the pile at the junctures with the flanges. Copes shall be made in accordance with AWS D1.1, Section 5.17. If backing is used it shall be in accordance with AWS D1.1, removal of the backing after welding is not required.

Personnel performing quality assurance (QA) and process control (PC) welding inspection shall be qualified as a certified welding inspector (CWI) in accordance with AWS D1.1, Chapter 6. All welded pile splices shall be made in accordance with a written Welding Procedure Specification (WPS), as submitted by the Contractor. The WPS shall be reviewed, and approved by the Contractor’s CWI, prior to welding any piling splices on the project. The WPS shall list all essential variables of the process in accordance with AWS D1.1. The WPS shall be available to those authorized to use or examine.

All welded splices shall be made with low hydrogen electrodes. The Contractor shall adhere to the low hydrogen practice for electrodes in accordance with AWS D1.1.

All cuts at splices shall be made normal to the longitudinal axis of the pile. The cut-off portion may be driven to start the next pile or it may be welded to previously driven piles to provide the necessary extension length.

All welders shall be currently qualified in accordance with AWS D1.1. Welder qualifications shall be approved by the Contractor’s CWI prior to the start of welding. The welder shall take all steps to be requalified if any essential variables listed in AWS D1.1 are not met.

The Contractor shall provide an AWS Certified Welding Inspector (CWI) on the project site for PC. The CWI shall inspect all production stages of the welded splice, including assembly of the splice joint, during welding, and after welding to ensure that workmanship and materials meet the requirements of the contract documents. The CWI shall be responsible for acceptance or rejection of the material and the workmanship. The CWI shall keep a record of all findings, which shall be available to the Engineer at any time.

The first two CJP welded splices shall be ultrasonically tested (UT) for acceptance in accordance with Table 6.3 of AWS D1.1. If both of the UT tested CJP splices are determined to be acceptable, no further UT testing of CJP splices will be required. If either of the first two UT tested CJP splices are not acceptable, UT testing of CJP splices shall continue until two consecutive tests are acceptable.

Personnel performing UT testing of CJP splices shall be qualified in accordance with the current edition of the American Society for Nondestructive Testing Practice No. SNT-TC-1A. Individuals who perform nondestructive testing shall be qualified for NDT Level II.

In subsection 502.12, delete the fifth paragraph and replace with the following:

Partial Joint Penetration (PJP) welded splices for piles, when specified in the plans, will be measured as the additional length of pile, each splice considered as 3 linear feet.

CJP welded splices, when specified in the plans, will be the actual number completed and accepted.

Subsection 502.13 shall include the following:

**Pay Item Pay Unit**

Complete Joint Penetration (CJP) Splice Each

All costs for providing Certified Welding Inspector (CWI) services for Partial Joint Penetration (PJP) welded splices will not be measured and paid for separately, but shall be included in the additional measured length of pile in accordance with subsection 502.12.

Payment for completing the CJP splices shall include the CJP splice, Ultrasonic Testing, Certified Welding Inspector (CWI) services and all required documentation.