
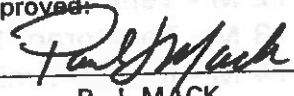
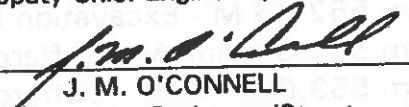


To:  <b>SUPERSEDED</b> <sup>BY</sup> <i>EB 99-066</i> <i>EFFECTIVE 11/4/99</i>		New York State Department of Transportation <b>ENGINEERING          INSTRUCTION</b>	<b>EI</b> <b>98-032</b>
<b>TITLE: SUPPORT AND PROTECTION SYSTEMS, COFFERDAMS AND WATERWAY DIVERSION STRUCTURES. WITH ADDITIONAL CHANGES TO STANDARD SPECIFICATION SECTIONS 202, 206, 644, 670 AND 680.</b>			
Distribution: <input checked="" type="checkbox"/> Manufacturers (18) <input checked="" type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ ( )		Approved:  _____ P. J. MACK Deputy Chief Engineer (Research) <i>9/10/98</i> <span style="float: right;">Date</span>  _____ J. M. O'CONNELL Deputy Chief Engineer (Structures) <i>9/23/98</i> <span style="float: right;">Date</span>	

**EFFECTIVE DATE:**

This Engineering Instruction is effective with Department contracts let on or after June 10, 1999.

**PURPOSE:**

The purposes of this instruction are to:

1. Replace Standard Specification Section 552 - SHEET PILING AND COFFERDAMS with Section 552 - SUPPORT AND PROTECTION SYSTEMS.
2. Issue a new Standard Specification Section 553 - COFFERDAMS AND WATERWAY DIVERSION STRUCTURES.
3. Revise the following Standard Specifications:
  - a. Section 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS
  - b. Section 644 - SIGN STRUCTURES
  - c. Section 670 - HIGHWAY LIGHTING SYSTEM
  - d. Section 680 - TRAFFIC SIGNALS
4. Replace Standard Specification Section 206 - TRENCH, CULVERT AND STRUCTURE EXCAVATION.

**5. Issue the following new items:**

- Item 206.04 M - Trench and Culvert Excavation - O.G.
- Item 552.10 M - Permanent Timber Sheeting
- Item 552.11 M - Permanent Steel Sheeting
- Item 552.12 M - Temporary Timber Sheeting
- Item 552.13 M - Temporary Steel Sheeting
- Item 552.14 M - Interim Timber Sheeting
- Item 552.15 M - Interim Steel Sheeting
- Item 552.16 M - Excavation Protection System
- Item 553.01nnnn M - Cofferdams (Type 1)
- Item 553.02nnnn M - Cofferdams (Type 2)
- Item 553.03nnnn M - Temporary Waterway Diversion Structure

**6. Delete the following items:**

- Item 552.01 M - Permanent Timber Sheet Piling
- Item 552.02 M - Permanent Steel Sheet Piling
- Item 552.03 M - Temporary Timber Sheet Piling
- Item 552.04 M - Temporary Steel Sheet Piling
- Item 552.05 M - Safe Operation Sheet Piling
- Item 552.06nnnn M - Cofferdams
- Item 552.07nnnn M - Cofferdams (Water Discharge Control)

All metric Special Specifications with a base number of 552.

**BACKGROUND:**

In order to better reflect current Department construction practice, sheet piling and cofferdam specifications along with trench, culvert and structure excavation specifications needed to be revised.

The following recommendations were made:

- Use Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA) definitions with minor clarifications.
- Eliminate Safe Operation Sheet Piling and replace with OSHA requirements.

- Create a new item, Excavation Protection System, to protect workers where a lay-back option is not available and vibration or minor repairable subsidence is not considered a problem. This change is in response to the increased use of pre-engineered systems such as trench boxes and shields.
- Create sheeting items for situations where sheeting need not be new material and will be cut off to a specified elevation and left in place after use.
- Create two cofferdam items; one type requiring the contractor to submit a design, including computations and method of installation for review for cofferdams exceeding 2.5 meters or special conditions and another cofferdam type that only requires a submittal of the methods to be employed, for shallower situations.
- Create a Temporary Waterway Diversion Structure item for use when cofferdam items are inappropriate.
- Create a Trench and Culvert Excavation Item which specifies the top payment line as the ground surface prior to commencing work.

**RELATED ACTIONS:**

Usage guidelines for most of these specifications were included in Section 4 of the New York State Department of Transportation Bridge Manual which was released by Engineering Bulletin EB 98-014. Engineering Instruction EI 98-033, titled "Guidelines for Using Standard Specification Section 552-Support and Protection Systems and Section 553 - Cofferdams and Waterway Diversion Structures", supersedes Section 4 in its entirety. Additionally, it provides guidance for Standard Specification Sections 644, 670 and 680.

Pending the issuance of Bridge Detail (BD) Sheets related to excavation and embankment details, designers should incorporate the provisions of this EI into the use of Bridge Design Data Sheets BDD 95-2R1 and 95-M2R1.

**ACTIONS BY THE MAIN OFFICE DESIGN QUALITY ASSURANCE BUREAU:**

The revised specifications shall be Main Office inserts until they can be incorporated into the Standard Specifications.

**ACTIONS BY PROJECT DESIGNERS:**

Before using existing special specifications which require excavation, check to ensure they do not require safe operation sheet piling and that references to Section 552 are appropriate.

**CONTACT PERSON:**

Any questions regarding these specifications should be directed to Dan Feeser of the Structures Division at (518) 457-5715.

## SECTION 202

### Pg. 2-5 Subsection 202-3.01 **General and Safety Requirements**

After line 27 add the following paragraph:

“When excavation is required, the safety of the workers and the public shall be the responsibility of the Contractor. Protection of the workers shall conform to the requirements contained in Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA) while protection for the public shall conform to that specified in Subsection 107-05 Safety and Health Requirements Paragraph E.”

### Pg. 2-12 Subsection 202-3.09 **Removal of Substructures**

Add the following sentence to the end of line 9:

“The excavation shall be dewatered and kept free from water, snow and ice when necessary.”

Delete the fourth paragraph (Lines 16 thru 23) and substitute the following:

“If excavation protection is required solely to ensure the safety of workers and the public, it shall be the Contractor’s responsibility to provide workers protection in accordance with the requirements of Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA). The selection of protection system materials shall be the Contractors option. The Engineer may reject any system that is unsafe. Public safety shall be provided in accordance with the requirements specified in Subsection 107-05 Safety and Health Requirements Paragraph E. If the protective system is necessary also to protect structures or other improvements, or if the alternatives of laying back slopes or benching are not available, the support system shall be as indicated. Payment will be made under the designated respective item.”

### Pg. 2-13 Subsection 202-4.07 **Removal of Substructures**

Delete line 15 which states “whether or not the slopes are laid back or benched in lieu of installing Safe Operation Sheet Piling” and substitute the following:

“irrespective of the excavation protection method chosen by the Contractor under 202-3.09”

### Pg. 2-14 Subsection 202-5.05 **Dismantling and Storing Existing Superstructures and Removing Existing Superstructures**

On Line 4, add the following to the sentence which ends with the word “operation” :

“and any protective system(s) required to ensure the safety of the workers or the public unless indicated on the plans.”

On lines 4 and 5, delete the words "Temporary Sheet Piling, Safe Operation Sheet Piling" and substitute the following:

"Support or protection systems when indicated on the plans"

**Pg. 2-14 Subsection 202-5.06 Removal of Substructures**

On line 11, add the following to the sentence which ends with the work "piling":

"the protective system(s) required to ensure the safety of the workers and the public, unless indicated on the plans, and keeping the site dewatered and free of water, ice and snow when necessary."

On lines 11 and 12 delete the words "Temporary Sheet Piling, Safe Operation Sheet Piling" and substitute the following:

"Support or protection systems when indicated on the plans"

SECTION 206

Delete existing Section 206 Trench, Culvert and Structure Excavation in its entirety and substitute the following:

**SECTION 206 - TRENCH, CULVERT AND STRUCTURE EXCAVATION**

**206-1 DESCRIPTION**

**206-1.01 General.** This work shall consist of the excavation of all materials and backfill or disposal of excavated material required for trenches, culverts, structures, conduit and direct burial cable not otherwise provided for in other sections of these specifications. All such excavation shall be unclassified excavation as defined in §203-1.01. The work shall also consist of all required protection necessary to ensure the safety of the workers and the public.

**206-1.02 Trench and Culvert Excavation and Trench and Culvert Excavation - O.G..** The work specified under these items shall include the excavation for and backfill of all culverts, pipe lines, and other minor structures including but not limited to leaching basins, catch basins, field inlets, manholes and drop inlets.

**206-1.03 Structure Excavation.** The work specified under this item shall include the excavation for all bridge foundations, walls and other major structures and backfill of suitable excavated material if another item is not specified.

**206-1.04 Conduit Excavation and Backfill.** The work specified under this item shall include the excavation and necessary backfill required for conduits and direct burial cables.

**206-2 MATERIALS.** (Not Specified).

**206-3 CONSTRUCTION DETAILS**

**206-3.01 General.** The appropriate construction details specified for "Excavation and Embankment" in §203-3.01 through and including §203-3.12, §203-3.15, and the requirements of "Legal Relations and Responsibility to Public" in §107 shall apply to the work specified in this section.

The excavation shall be dewatered and kept free from water, snow and ice when necessary.

Special care shall be taken not to disturb the bottom of the excavation, and not to remove the material at final grade until just before the structure is placed.

The Contractor shall be responsible at all times for carrying out of all excavation operations in a safe and prudent manner so that the workers, the public, and adjacent public and private property will be protected from unreasonable hazard. Details and requirements of this protection shall conform to Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA) and Subsections 107-05 Safety and Health Requirements Paragraph E and 107-08 Preservation of Property. All applicable local, State and/or Federal requirements shall be observed and necessary permits acquired by the Contractor.

If no support or protective system is shown in the plans or proposal, the Contractor may open the excavation with the sides sloped to a stable slope not steeper than that allowed by the Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA). Taking this option,

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however, does not relieve the Contractor of responsibilities as stated in this subsection. When the Contractor chooses this option, the materials used and method of construction outside the payment lines shall be in accordance with the requirements of this Section.

When excavation is required for the installation of conduit or direct burial cable, the Contractor shall notify the Engineer upon completion of the excavation. No conduit or cable shall be placed in the excavation until the Engineer has approved the depth and cross-section.

**206.3.02 Replacement of Pavement Structure Courses.** When the Contractor, in placing conduits, direct burial cable or utilities, excavates into the pavement, subgrade, subbase, or shoulder courses, such courses must be replaced in kind, character and condition, to maintain a uniform road section.

**206-3.03 Disposal of Excavated Material.** The provisions of Subsection 203-3.06 and/or 203-3.07 shall apply to all material excavated under this section which is not used as backfill.

## 206-4 METHOD OF MEASUREMENT

**206-4.01 General.** The quantity of excavation shall be the number of cubic meters of material computed from payment lines shown on the plans or the appropriate standard sheets, except where revised payment lines are established by the Engineer prior to performing the work. Work performed beyond any designated payment line will not be included in the computation of quantities for the item involved.

**206-4.02 Trench and Culvert Excavation.** Unless otherwise shown or indicated on the contract plans, payment lines for excavation of pipe and culvert lines, and minor structures will be determined as follows:

**A. Bottom Payment Line.** The elevation of the bottom payment line shall be the invert elevation of the pipe, conduit, or culvert. For pipes, conduits, or culverts of nominal horizontal dimensions of 300 to 3700 mm, the width of the excavations at the bottom payment line shall be the nominal inside horizontal dimension of the pipe, conduit, or culvert plus 1.2 m, or three (3) times the nominal inside horizontal dimension, whichever is less; for pipes with a nominal horizontal dimension greater than 3700 mm the width will be as shown on the appropriate standard sheets or in the contract documents. For concrete pipe, twice the minimum wall thickness shall be added to the preceding.

**B. Top Payment Line.** Except when otherwise provided in the contract, the payment line in a cut section shall be the surface at the centerline of the pipe, culvert or conduit after completion of the general excavation and prior to excavation to place material paid for under another item of the contract; except that, when an undercut is made for unstable conditions, the payment line will be at the top of the undercut backfill. The payment line in a fill section shall be the ground surface prior to commencing work on the contract.

**C. Side Payment Lines.** The side payment lines of the excavation shall be vertical to the bottom of payment line, regardless of whether sheeting is or is not required or used.

For utility lines, exclusive of conduit and cable lines, of less than 300 mm diameter, the excavation width shall be the actual bottom width necessary, as determined by the Engineer, to properly perform the installation work required, or 1 m, whichever is less.

**D. Payment Lines for Minor Structures.** Payment lines for minor structures shall be vertical from the bottom of the footing and shall extend out 0.6 m from the perimeter of the structure

footing. The top payment line shall be the same as for (B) above.

**206-4.03 Conduit Excavation and Backfill.** The quantity of conduit and/or cable excavation and backfill for payment shall be the number of linear meters measured along the center of the conduit and/or cable placed, in accordance with the methods stated below.

Wherever a pair or group of conduits and/or cables are physically connected together, they shall be considered as a single conduit and/or cable.

**Method of Measurement**

A. Wherever conduit and/or cable in the same trench are physically separated laterally by 150 mm or more between centerlines, as shown on the plans or as directed by the Engineer, the linear meter measurement shall be made along the center of each conduit and/or cable.

B. Wherever a pair or group of conduits and/or cable in the same trench are physically separated laterally by less than 150 mm between centerlines of adjacent conduit and/or cable, as shown on the plans or as directed by the Engineer, the linear meter measurement for those conduits and/or cable shall be made along the center of that pair or group of conduit and/or cable.

**206-4.04 Trench and Culvert Excavation - O.G.** The provisions of Subsection 206-4.02 Trench and Culvert Excavation shall apply with the following modification:

**B. Top Payment Line.** The payment line shall be the existing ground surface at the centerline of the pipe, culvert or conduit prior to commencing work on the contract.

**206-5 BASIS OF PAYMENT**

**206-5.01 Trench, Culvert and Structure Excavation.** The unit price bid for this work shall include the cost of labor, materials and equipment required to satisfactorily complete the work, including the costs of excavation, backfill (except select backfill paid for separately), disposal of excavated material, presplitting rock excavations where required, and keeping the site dewatered and free from earth, water, ice and snow when necessary.

The cost for necessary guarding and protection required to protect the public from open trenches and that required for the protection to ensure the safety of the workers shall be included in the bid price for Trench, Culvert and Structure Excavation. Progress payments will be made after the excavation has been completed, and prior to the completion of other work included under this item, including but not limited to pumping, fencing and backfilling. Payment will be made, at the unit price bid, for 75% of the quantity excavated within the prescribed payment lines. The balance of the quantity excavated will be paid for upon proper completion of backfill placement.

If the Contractor chooses the slope layback option to satisfy OSHA, no extra payment will be made for the cost of any labor, equipment or material necessary to restore the area outside the payment lines shown on the plans.

**206-5.02 Sheeting, Cofferdams or Temporary Water Diversion Structures.** Payment for Sheeting, Cofferdams or Temporary Water Diversion Structures required by the plans, specifications, or ordered by the Engineer in writing will be made in accordance with the appropriate item.

Where cofferdams are specified for structure excavation, the work required to keep the site free from earth, water, ice and snow shall be included in the item for cofferdams when necessary.

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**206-5.03 Replacement of Pavement Structure Courses.** With exception of the Conduit Excavation and Backfill item, the work of replacing pavement, subcourses and shoulder courses shall be paid for and performed under the provisions of their respective items and subsections.

**206-5.04 Conduit Excavation and Backfill.** The unit price bid per linear meter for this work shall include the cost of furnishing all labor, materials and equipment necessary to excavate and backfill the trench and to replace any pavement, shoulder, and sidewalk courses, subcourses, curbs, drives, lawns and other top surfaces as required to complete the work.

***Payment will be made under:***

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
206.01 M	Structure Excavation	Cubic Meter
206.02 M	Trench and Culvert Excavation	Cubic Meter
206.03 M	Conduit Excavation and Backfill	Meter
206.04 M	Trench and Culvert Excavation - O.G.	Cubic Meter

## SECTION 552

Delete existing Section 552 **Sheet Piling and Cofferdams** in its entirety and substitute the following:

### **SECTION 552 - SUPPORT AND PROTECTION SYSTEMS**

#### **552-1 DESCRIPTION**

**552-1.01 Permanent Sheeting.** Under this work, the Contractor shall furnish and place permanent sheeting of the type, at the locations and to the elevation(s) shown on the plans.

All the sheeting and supports will be left in place as a finished structure unless removal of waling and bracing is called for on the plans.

**552-1.02 Temporary Sheeting.** This work shall include the requirements specified in Subsection 552-1.01 Permanent Sheeting with the following addition:

The Contractor shall be required to maintain the sheeting while in place, and remove it from the job site after its function has been accomplished or when ordered by the Engineer. It may be left in place only with the written permission of the Engineer.

**552.1.03 Interim Sheeting.** Under this work, the Contractor shall furnish and place sheeting of the type, at the locations and to the elevation(s) shown on the plans.

The Contractor shall be required to maintain the sheeting while it is serving its function.

The interim sheeting shall be cut off and removed only to the elevation shown on the plans. The remaining material shall be left in place.

**552-1.04 Excavation Protection System.** Under this work, the Contractor shall design, furnish, place, maintain and remove an excavation protection system (EPS) at locations shown on the plans or as ordered by the Engineer. Details of the EPS must conform with the requirements of Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA), and installation shall be in accordance with the State and Federal Safety Codes. A sloping (layback) option will not be allowed.

Sheeting, shoring, a shield system, i.e. trench box or trench shield or other pre-engineered protective system may be used to prevent cave-ins. The requirements of any protective system shall be as contained in Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA). It may be left in place only with the written permission of the Engineer.

#### **552-1.05 Alternate Design**

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The Contractor may submit to the Department a construction alternate other than that presented in the contract documents. Slope lay back will not be allowed. Any geotechnical analysis for a flexible support system shall be done in accordance with the procedures contained in the appropriate departmental publication which is current on the date of advertisement for bids. This publication is available upon request to the Regional Director or the Director, Geotechnical Engineering Bureau. All of the requirements and conditions contained in Subsection 110-02 Value Engineering shall apply.

## 552-2 MATERIALS

### 552-2.01 Permanent Sheeting

**A. Permanent Timber Sheeting.** Timber sheeting shall be new and unused and consist of any acceptable species which can be placed satisfactorily. The sheeting shall have a preservative treatment conforming to the American Wood-Preservers Association (AWPA) Standard C-2, Soil Contact. The timbers shall not be less in actual cross section or stress grade than that shown on the plans. Stress grading and acceptance shall be in accordance with the requirements and provisions of Subsection 712-14, Stress Graded Timber and Lumber. The timbers shall be sound and free from any defects which might impair its strength or tightness. The materials shall include all necessary waling and bracing required.

**B. Permanent Steel Sheeting.** Steel sheeting shall be new and unused conforming to the requirements of ASTM A328M unless otherwise indicated on the plans. Waling and bracing shall be new and unused conforming to the requirements of ASTM A36M unless otherwise indicated on the plans. The sheeting shall not have a section modulus less than that shown on the plans. Stock steel may be used. The Contractor shall furnish to the Engineer, certified copies of physical and chemical test results which shall include a sworn statement by a qualified mill representative to the effect that the subject material conforms to the requirements of the steel specified.

### 552-2.02 Temporary Sheeting

**A. Temporary Timber Sheeting.** The provisions of Subsection 552-2.01A Permanent Timber Sheeting shall apply with the following modifications:

The timber sheeting may consist of new or used, treated or untreated material but must be in satisfactory condition and suitable for the intended use. The Engineer may disapprove and reject used materials regarded to be unsatisfactory.

**B. Temporary Steel Sheeting.**

The steel sheeting, waling and bracing may consist of new or used material but must be in satisfactory condition and suitable for the intended use. The section modulus of the sheeting shall not be less than that shown on the plans. The materials shall include all necessary waling and bracing required. The Engineer may, disapprove and reject used materials regarded to be unsatisfactory.

### **552-2.03 Interim Sheeting**

- A. **Interim Timber Sheeting.** The provisions of Subsection 552-2.02A Temporary Timber Sheeting shall apply.
- B. **Interim Steel Sheeting.** The provisions of Subsection 552-2.02 B Temporary Steel Sheeting shall apply.

**552-2.04 Excavation Protection System.** The selection of EPS materials shall be the Contractor's option. The Engineer may disapprove and reject materials regarded to be unsatisfactory.

### **552-3 CONSTRUCTION DETAILS**

**552-3.01 General.** Any material which stops the driving of sheeting within a depth of three meters from the ground surface at the time of driving, shall be removed by the Contractor. Payment for removal of such material will be made under the appropriate excavation item. If very compact material or boulders prevent the progression of the sheeting to the design tip elevation at a greater depth, the Contractor shall notify the Engineer.

**552-3.02 Temporary Sheeting.** The requirements of Subsection 552-3.01 General shall apply with the following addition:

Upon completion of the structure, the Contractor will remove the sheeting placed under this work, or with the written permission of the Engineer, leave it in place after cutting off the tops at an agreed elevation.

**552-3.03 Interim Sheeting.** The provisions of Subsection 552-3.01 General shall apply with the following modification:

The interim sheeting shall be cut off and removed only to the elevation shown on the plans. The remaining material shall be left in place.

**552-3.04 Excavation Protection System.** The EPS installed under this item shall be of sufficient size and strength to meet the requirements of Title 29, Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA), and the Live Load requirement as contained in the Standard Specifications for Highway Bridges adopted by AASHTO. Prior to use, the Contractor shall supply the Engineer with documentation of compliance.

All damage to the adjacent pavement or ground caused by the use of the chosen EPS (eg. Voids beneath the pavement or shoulder, pavement or shoulder cracking or subsidence, ground settlement) shall be repaired to the satisfaction of the Engineer at no additional cost to the State. Severe damage which directly affects the safety of the public shall be immediately repaired to the satisfaction of the Engineer. The operation shall be halted until a satisfactory prevention method is instituted.

### **552-4 METHOD OF MEASUREMENT**

**552-4.01 Permanent Sheeting.** The quantity of sheeting to be paid for shall be the number of square meters obtained by multiplying the vertical length of sheeting measured between the payment lines herein

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described, by the horizontal length of sheeting shown on the plans or approved by the Engineer. The vertical length of sheeting is that length measured between the upper and lower payment lines. The upper payment line, unless otherwise specified on the plans or approved by the Engineer, shall be the original ground at the time of commencing work. The lower payment line shall be the elevation shown on the Plans as the minimum embedment depth unless otherwise authorized in writing by the Engineer.

The horizontal length shall be measured along a projection of the sheeting on a plane parallel to and midway between the front and rear face of the sheeting wall.

**552-4.02 Temporary Sheeting.** The provisions of Subsection 552-4.01 Permanent Sheeting shall apply.

**552-4.03. Interim Sheeting.** The provisions of Subsection 552-4.01 Permanent Sheeting shall apply.

**552-4.04 Excavation Protection System.** The quantity of protection system to be paid for shall be the number of square meters obtained by multiplying the vertical length measured between the payment lines herein described, by the horizontal length of EPS shown on the plans or approved by the Engineer. The vertical length is that length measured between the upper and lower payment line. Unless otherwise specified on the plans, the upper payment line shall be the ground surface existing at the site prior to the beginning of the work, or as ordered, in writing, by the Engineer. Unless otherwise indicated on the plans or in the proposal, the lower payment line shall be the bottom of the excavation shown on the plans immediately adjacent to the protection system. The horizontal length shall be the actual length of protection system installed measured along the payment lines as shown on the contract plans. Both sides of the excavation shall be measured and computed for payment.

**552-4.05 Stage Construction.** When the support system is used in stage construction, the quantity of support system to be paid shall be the maximum number of square meters satisfactorily installed between the payment lines shown in the Contract Documents measured on either, but not both sides, of adjacent construction stages.

### 552-5 BASIS OF PAYMENT

**552-5.01 Permanent Sheeting.** The unit price bid, per square meter, for this work shall include the cost of furnishing all labor, materials and equipment necessary to complete this work, including driving equipment, waling, bracing and design services when employed. The cost of maintaining the excavated area free from earth, water, ice, and snow will be included in the price bid for the appropriate excavation item.

**552-5.02 Temporary Sheeting.** The provisions of Subsection 552-5.01 Permanent Sheeting shall apply except that estimate payments in the amount of 75% of the bid amount shall be made upon installation of the sheeting with the remainder paid upon its satisfactory removal. If the Contractor leaves all or part of the sheeting in place, it will be at their own expense and the remaining 25% of the bid amount shall be paid after its function is no longer required.

**552-5.03 Interim Sheeting .** The provisions of Subsection 552-5.01 Permanent Sheeting shall apply except that estimate payments in the amount of 75% of the bid amount shall be made upon installation of the sheeting with the remainder paid upon satisfactory removal of that portion specified in the contract

documents. If the support system is to be left in place in its entirety, the remainder shall be paid after its function is no longer required. The cost of any work necessary to cut off and remove the specified portion shall be included in the unit price bid.

**552-5.04 Excavation Protection System.** The unit price bid, per square meter, for this work shall include the cost of furnishing all labor materials and equipment necessary to complete this work, including driving equipment, waling, bracing, and design services when employed.

If the Engineer, in writing, orders that the EPS be left in place, this will be classified as extra work and will be paid for in accordance with Subsection 104-03, Contingencies, Extra Work, Deductions.

Payment will be made under:

<b>ITEM NO.</b>	<b>ITEM</b>	<b>PAY UNIT</b>
552.10 M	Permanent Timber Sheeting	Square Meter
552.11 M	Permanent Steel Sheeting	Square Meter
552.12 M	Temporary Timber Sheeting	Square Meter
552.13 M	Temporary Steel Sheeting	Square Meter
552.14 M	Interim Timber Sheeting	Square Meter
552.15 M	Interim Steel Sheeting	Square Meter
552.16 M	Excavation Protection System	Square Meter

ADD SECTION 553 as follows:

## SECTION 553 - COFFERDAMS AND WATERWAY DIVERSION STRUCTURES

### 553-1 DESCRIPTION.

**553-1.01 General.** All work done under this Section shall conform to all Federal, State, County and Local Regulations and permit conditions.

**553-1.02 Cofferdam.** Under this work, the Contractor shall design, furnish, place, maintain, and remove cofferdams together with all necessary waling and bracing, and dewatering equipment within the limits shown on the plans. The Contractor shall also construct, maintain, stabilize, backfill and restore adequate sediment removal area(s) for water discharge control at location(s) shown on the plans or where allowed by the Engineer in accordance with all applicable permits.

If a waterway diversion structure is proposed as a substitution, approval of the Engineer must be obtained. A review by the appropriate permitting agency(ies) will be required. Any delay due to this review and approval process will not be a basis for an extension of time.

**553-1.03 Temporary Waterway Diversion Structure.** Under this work, the Contractor shall design, furnish, install, maintain, and remove a temporary water diversion structure at the location(s) shown on the plans or as ordered by the Engineer.

### 553-1.04 Submittals.

#### A. Cofferdams.

- 1. General.** Cofferdams shall be designed by a Professional Engineer, licenced and registered to practice in New York State. All systems submitted shall be designed for the static water pressure plus stream pressure and ice pressures as appropriate. Stresses shall not exceed the allowable given in AASHTO Standard Specifications for Highway Bridges. The Contractor shall indicate the water elevation above which the system should be flooded to avoid overloading. The Contractor's Engineer shall design the cofferdam to conform to all Federal, State, County and Local Regulations and Permits.
- 2. Cofferdams (Type 1).** The Contractor shall submit the design, including computations and method of installation, to the Engineer for review by the Deputy Chief Engineer Structures (D.C.E.S.). The D.C.E.S. shall be allowed 20 working days for review. Permission to proceed must be received, prior

to beginning construction of any cofferdam. The furnishing of such information and receipt of permission to proceed shall not serve to relieve the Contractor of its responsibility for the safety of the workers, the need to meet permit conditions, and the successful completion of the work.

3. **Cofferdams (Type 2).** Prior to beginning construction of any cofferdam, the Contractor shall submit the methods to be employed to the Engineer for review and approval. Ten working days shall be allowed for review. Construction shall not be started prior to receipt of approval.

**B. Temporary Waterway Diversion Structure.** Prior to beginning construction/installation of any temporary waterway diversion structure, the Contractor shall submit the methods to be employed to the Engineer for review and approval. Ten working days shall be allowed for review. Construction shall not be started prior to receipt of approval.

**553-2 MATERIALS.** The materials shall be timber or steel sheeting of a quality equivalent to that specified in Subsection 552-2.02 Temporary Sheeting of Support and Protection Systems, tightly sealed impermeable earth filled bags, precast concrete, a commercially designed system manufactured specifically for the control of water or as indicated in the cofferdam design submitted for review.

**553-3 CONSTRUCTION DETAILS.**

**553-3.01 Cofferdams.** Cofferdams shall be constructed so as to keep the excavations free from earth, water, ice, or snow, and to permit excavations to be carried to the depths indicated on the plans. Cofferdams, when used in conjunction with a tremie pour, shall be designed and constructed to automatically flood by non-mechanical means such as over topping or flooding ports. The automatic flooding elevation shall be as indicated by note in the plans.

In the event that permanent or temporary sheeting is required by the plans at the location of the cofferdam, the Contractor may elect to incorporate this material into the cofferdam system. Additional bracing may be required to satisfactorily perform excavation, dewatering, and other required construction operations. The permanent sheeting system shall be returned to its intended condition after all cofferdam equipment and material, including any additional bracing, has been removed. All damage done to the temporary system, if still required, or permanent sheeting, shall be repaired at the Contractor's expense, to the satisfaction of the Engineer.

Unless otherwise indicated on the plans, cofferdams shall be maintained in a dewatered condition during foundation construction. The placement of foundation concrete shall not be impeded by water standing or flowing within the cofferdam.

If a waterway diversion structure is approved as a substitution, all of the requirements of Subsection 553-3.02 Temporary Waterway Diversion Structure shall apply.

Dewatering equipment and any additional bracing shall be of adequate quality and capacity and shall be so arranged as to permit their proper functioning in connection with the cofferdam. Dewatering equipment and bracing shall be so located to permit construction of the structure in accordance with the plans.

All damage caused by the failure of a cofferdam to perform its proper functions shall be the responsibility of the Contractor. It shall also be the Contractor's responsibility to protect all stream banks from erosion by reason of restriction of the channel caused by the erection of the cofferdam to limits greater than that shown on the plans for the Contractor's own convenience. In that situation, all material which erodes from the banks during that time the cofferdam is in place shall be replaced by the Contractor at the Contractor's own expense. The Engineer, in consultation with the regulatory permit agency(ies) representative(s), will be the sole determiner of the nature and extent of all damages and mitigation requirements. The Engineer shall approve all repair methods proposed by the Contractor prior to the Contractor beginning any remedial activities for which they are liable.

It shall be the Contractor's responsibility to place the cofferdam so that it will not interfere with any batter piles.

The Contractor shall establish and maintain a sediment removal area(s) to retain the discharge for a sufficient period of time using equivalent best management practices as approved by the Engineer, in order that the discharge entering the stream will be as clear as the flowing stream.

**553-3.02 Temporary Waterway Diversion Structure.** Waterway diversion structures shall be constructed at the location(s) as shown on the plans so as to divert the flow of water. The structure shall be continuous and constructed in accordance with any regulatory agency permit conditions.

If a system commercially designed and manufactured specifically for the control of water is used, it shall be installed and maintained in accordance with the manufacturer's recommendations.

All damage caused by the failure of the temporary water diversion structure to perform its proper function shall be repaired by the Contractor at no cost to the State.

**553-3.03 Removal.** The Contractor shall remove the temporary portion of the cofferdam installation or the waterway diversion structure, including anchor spuds if used, after such time that it is determined by the Engineer to be no longer necessary. The removal shall be sequenced to minimize turbidity and the discharge of materials into the waterway. Additional temporary erosion control measures, as determined by the Engineer, may need to be employed to facilitate removal.

#### **553-4 METHOD OF MEASUREMENT.**

**553-4.01 Cofferdams.** Measurement will be for each cofferdam actually established where indicated on the plans.

In those cases where approval is given to construct a waterway diversion structure in lieu of a cofferdam, the cost of the diversion will be paid at the unit price bid for the cofferdam work.

**553-4.02 Temporary Waterway Diversion Structure.** Measurement will be for each temporary waterway diversion structure actually constructed in accordance with the requirements of the contract documents and to the satisfaction of the Engineer.

**553-5 BASIS OF PAYMENT.**

**553-5.01 Cofferdams.** The unit price bid for each cofferdam shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work, including pile driving equipment, waling, and bracing, anchor spudding, maintaining in a dewatered condition, and final removal. No separate payment will be made for any additional temporary erosion control measures required to facilitate removal. In addition, all costs associated with the removal of any sediment deposited in the waterway due to the Contractor's operations shall be included. When a cofferdam is installed incorporating permanent or temporary sheeting required by the plans, payment will be made for each cofferdam established, including any miscellaneous sheeting, additional bracing, anchor spudding, or other material necessary to complete the work. The permanent or temporary sheeting, if used as part of the cofferdam, will be paid for under a separate item. The cost of establishing, maintaining, stabilizing, backfilling and restoring the sediment removal area(s) shall also be included in the price bid. No separate payment will be made for any repairs of damage required due to the failure of a cofferdam to perform its proper function.

Progress payments will be made. Seventy-five percent of the bid price will be paid after cofferdam installation, construction of the sediment removal area(s) and initial dewatering. The remaining percentage will be paid upon satisfactory removal of the cofferdam and restoration of the sediment removal area(s).

**553-5.02 Temporary Waterway Diversion Structures.** The unit price bid for each diversion structure shall include the cost of furnishing all labor, equipment, and materials necessary to satisfactorily install, maintain, and remove the diversion structure and any additional temporary erosion control measures required to facilitate removal.

No separate payment will be made for any repairs of damage required due to the failure of a waterway diversion structure to perform its proper function.

In the event that the Contractor is required to extend the temporary waterway diversion structure beyond the limits shown on the plans, changes to the respective diversion structure will be classified as extra work and will be paid for in accordance with Subsection 104-03, Contingencies, Extra Work, Deductions.

When the waterway diversion structure is satisfactorily installed, seventy-five percent of the bid price will be paid. The remaining percentage will be paid when all temporary equipment and material have been removed and the waterway satisfactorily restored to its permanent location.