

| | | | |
|---|------------------------------|--|---------------------------------------|
| 2. AMENDMENT/MODIFICATION NO. 0003 | 3. EFFECTIVE DATE 3/29/00 | 4. REQUISITION/PURCHASE REQ. NO. | 5. PROJECT NO. <i>(If applicable)</i> |
| 6. ISSUED BY Department of the Army Memphis District, Corps of Engineers 167 North Main Street, Rm B202 ATTN: CEMVM-CT Memphis, TN 38103-1894 | | 7. ADMINISTERED BY <i>(If other than Item 6)</i> | CODE |

| | | |
|--|-----|---|
| 8. NAME AND ADDRESS OF CONTRACTOR <i>(No., street, county, State and ZIP Code)</i> | (✓) | 9A. AMENDMENT OF SOLICITATION NO. DACW66-00-B-0009 |
| | X | 9B. DATED <i>(SEE ITEM 11)</i> 2/17/00 |
| | | 10A. MODIFICATION OF CONTRACTS/ORDER NO. |
| | | 10B. DATED <i>(SEE ITEM 13)</i> |
| CODE | | FACILITY CODE |

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

| | |
|-----|--|
| (✓) | A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: <i>(Specify authority)</i> THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A. |
| | B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES <i>(such as changes in paying office, appropriation date, etc.)</i> SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b). |
| | C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: |
| | D. OTHER <i>(Specify type of modification and authority)</i> |

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

This solicitation for Kilgore Manhole and Culvert Replacement, Cairo, Alexander County, Illinois, Mississippi River and Levees - Maintenance, scheduled to open 13 APR 2000 at 2:30 p.m., is amended as follows:

- SECTION 00800, Table of Contents, page 00800-TOC-1: After listing for "1.2 Exclusion Periods in Computing Completion Schedules", delete "Not Used".

(CONTINUED ON NEXT PAGE)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

| | |
|--|---|
| 15A. NAME AND TITLE OF SIGNER <i>(Type or print)</i> | 16A. NAME AND TITLE OF CONTRACTING OFFICER <i>(Type or print)</i> |
| 15B. CONTRACTOR/OFFEROR | 16B. UNITED STATES OF AMERICA |
| 15C. DATE SIGNED | 16C. DATE SIGNED |
| _____ <i>(Signature of person authorized to sign)</i> | BY _____ <i>(Signature of Contracting Officer)</i> |

2. SECTION 00800, Paragraph 1.2: Delete “NOT USED” and substitute the following therefor:

“1.2. EXCLUSION PERIODS IN COMPUTING COMPLETION SCHEDULES. No work will be required during the period between 1 December and 30 June, inclusive. This period has not been considered in computing the time allowed for completion in accordance with paragraph 1.1 above. The Contractor may, however, perform work during all or any part of the non-work period provided that he has received prior approval therefor, in writing, from the Contracting Officer. In the event that the Contractor's operations are suspended at the beginning of or during this period, the Contracting Officer reserves the right to direct the Contractor to restore the work area to at least the level of flood protection existing prior to the Contractor's operations in the area, in accordance with the procedures of paragraph 1.53, all at no additional cost to the Government.”

3. Table of Contents, Technical Specifications, Page TOC-1: Delete existing page in its entirety and substitute the attached page therefor.
4. SECTION 02216: Delete the existing Section in its entirety and substitute the revised Section 02216 attached therefor.
5. SECTION 02411: Insert the new Section 02411 attached therefor.
6. SECTION 02720: Delete the existing Section in its entirety and substitute the revised Section 02720 attached therefor.

**KILGORE MANHOLE AND CULVERT REPLACEMENT
CAIRO, ILLINOIS**

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DIVISION 2 - SITEWORK

SECTION 02216

STONE PROTECTION

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SECTION 02216

STONE PROTECTION

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, equipment, and materials, and performing all operations in connection with the construction of stone protection as shown on the drawings or as directed by the Contracting Officer in accordance with these specifications and applicable drawings. At the flared end section at the influent end of the 1050 mm RCP culvert and at the effluent end of the existing 0.914 m x 0.610 m box culvert, stone protection consists of 150-mm bedding material covered by 450 mm of riprap material. At the outfall control structure of the 1050 mm RCP culvert, stone protection consists of 150-mm bedding material covered by 914 mm of riprap material. At the flared end section at the influent end of the 1050 mm RCP culvert, an Inverted Filter Drain shall be constructed prior to placement of the stone protection.

1.2 QUALITY CONTROL

The Contractor shall establish and maintain quality control for all stone protection testing and operations to assure compliance with contract requirements, and shall maintain records of the quality control for all construction including, but not limited to, the following:

1. Foundation preparation (line and grade).
2. Inspection at the work site to ensure use of specified materials.
3. Riprap gradation and placement.

A copy of these records of inspections and tests as well as the records of corrective action taken, shall be furnished to the Government.

1.3 REFERENCES

The following publication of the issue listed below, but referred to thereafter by basic designation only, forms a part of this specification to the extent indicated by the reference thereto:

US ARMY CORPS OF ENGINEERS, (COE)
HANDBOOK FOR CONCRETE AND CEMENT (CRD)

| | |
|--------------|---|
| CRD-C 106-93 | Unit Weight and Voids in Aggregate |
| CRD-C 107-94 | Specific Gravity and Absorption of Coarse Aggregate |

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Data

Equipment; FIO.

List of proposed equipment to be used in performance of construction work including descriptive data.

SD-09 Reports

Sampling and Testing; FIO. Density Test; FIO.

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Test results from samples, not less than 30 days before material is required for the work. Results of laboratory tests for quality control purposes, for approval, prior to using the material.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

All stone shall be durable material as approved by the Contractor Officer. The sources from which the Contractor proposed to obtain the material shall be selected well in advance of the time when the material will be required. Stone for riprap shall be of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, seams and other defects that would tend unduly to increase its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay and rock fines will not be permitted.

2.1.2 Sources and Evaluation Testing

Riprap shall be obtained in accordance with the provisions of SPECIAL CONTRACT REQUIREMENT paragraph entitled STONE SOURCES. If the Contractor proposed to furnish riprap from a source not currently listed, the Contractor shall make such investigations as necessary to determine whether acceptable stone can be produced from the proposed source. The Contractor shall submit suitable test reports and service records to show the acceptability of the stone. Satisfactory service records on work outside the Corps of Engineers will be acceptable. If no such records are available, the Contractor shall make tests to assure the acceptability of the stone. The tests to which the stone may be subjected will include

petrographic analysis, specific gravity, abrasion, absorption, wetting and drying, freezing and thawing and such other tests as may be considered necessary by the Contracting Officer. The following guidance is provided for use by the Contractor in analyzing a new source of stone. Stone that weighs less than 2483 kg/m³ (155 lbs/cf) and has more than 2% absorption will not be acceptable unless other tests and services records show that the stone is satisfactory. The method of tests for unit weight will be CRD-C 106, "Standard Test Method for Unit Weight and Voids in Aggregate". The method of tests for absorption will be CRD-C 107, entitled "Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate". Samples shall be taken by the Contractor under the supervision of the Contracting Officer at least 60 days in advance of the time the placing of the stone is expected to begin. The tests will be conducted in accordance with applicable Corps of Engineers methods of tests given in the Handbook for Concrete and Cement, and will be performed at an approved testing laboratory. The cost of testing will be borne by the Contractor.

2.1.3 Bedding Material

Bedding material shall consist of sand, gravel, or crushed stone, well graded between the prescribed limits as specified below. The material shall be composed of tough, durable particles, shall be reasonably free from thin, flat and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities considered objectionable by the Contracting Officer.

| <u>Sieve Size</u> | <u>Percent by Weight Passing</u> |
|--------------------|----------------------------------|
| 76 mm (3 inches) | 100 |
| 38 mm (1 ½ inches) | 85-100 |
| 19 mm (¾ inch) | 35-70 |
| 9.5 mm (3/8 inch) | 5-40 |
| No. 4 | 0-10 |

2.1.4 Riprap

Stone for riprap shall be durable and of a suitable quality to insure permanence in the structure and in the climate in which its is to be used. It shall be free from cracks, seams, and other defects that would tend to increase unduly its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay, and rock fines will not be permitted. The riprap shall be graded as follows:

R-90 Riprap Stone

| <u>Percent Lighter, by Weight</u> | <u>Stone Weight, Kilograms</u> |
|-----------------------------------|--------------------------------|
| 100 | 41-18 |
| 50 | 18- 9 |
| 15 | 9-2.5 |

R-650 Riprap Stone

| <u>Percent Lighter, by Weight</u> | <u>Stone Weight, Kilograms</u> |
|-----------------------------------|--------------------------------|
| 100 | 295-118 |
| 50 | 118- 59 |
| 15 | 59-18 |

Neither the breadth nor the thicknesses of any piece of riprap shall be less than 1/3 the length.

2.1.5 Test Method

Gradation test method shall conform to the requirements of “LMVD Standard Test Method for Gradation of Riprap” which is inserted at the end of this section as PLATE II. Also inserted at the end of this section is an Example Gradation, Specifications, and Worksheet (PLATE III), an Example Gradation plotted on ENG Form 4055 (PLATE IV), and an example Gradation Test Data Sheet (PLATE V).

2.1.6 Gradation Test

The Contractor shall perform a gradation test or tests on the riprap at the quarry. The sample shall be taken by the Contractor under the supervision of the Contracting Officer, shall consist of not less than 13.6 metric tons (15 tons) of riprap and shall be collected in a random manner which will provide a sample which accurately reflects the actual gradation arriving at the jobsite. If collected by the truckload, each truckload shall be representative of the gradation requirements. The Contractor shall provide all necessary screens, scales and other equipment, and the operating personnel therefor, and shall grade the samples, provide gradation test sample, data, and plot sheets/forms, all at no additional cost to the Government

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

Areas on which bedding layers are to be placed shall be trimmed and dressed to conform to cross sections shown on the drawings within an allowable tolerance of plus or minus 50 mm (2 inches) from the theoretical slope lines and grades. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by filling with bedding material and no additional payment will be made for any material thus required. Immediately prior to placing the gravel bedding the prepared base will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

3.2 FILTER FABRIC

Prior to any placement of bedding material and/or stone protection, geotextile filter fabric shall be placed as shown on the plans and as specified in SECTION 02215, GEOTEXTILE USED AS

FILTERS.

3.3 BEDDING MATERIAL LAYER

Bedding material layers composed of a 150 mm (6 inch) thickness shall be placed on compacted earth subgrade, after the compacted subgrade has been covered with a geotextile filter fabric specified in paragraph 3.2, within the limits shown on the drawings or as staked in the field, to form a backing for the riprap protection. Bedding material shall be spread uniformly on the prepared base, in a satisfactory manner, to the slope lines and grades indicated on the drawings or as directed. Placing of material by methods which will tend to segregate particle sizes within the bedding will not be permitted. Any damage to the surface of the bedding base during placing of the bedding shall be repaired before proceeding with the work. Compaction of the bedding layers will not be required but it shall be finished to present a reasonably even surface free from mounds or windrows.

3.4. INVERTED FILTER DRAIN

Prior to placement of the stone protection at the flared end section at the influent end of the 1050 mm Reinforced Concrete Pipe culvert, an Inverted Filter Drain shall be constructed as shown on the Plans. All material and work shall be subsidiary to the item "RIPRAP" listed in the Bid Schedule and shall be the responsibility of the Contractor. Before placement of the filter drain material, the Contractor shall properly excavate the filter drain area as shown on the Plans and as specified in Section 02225 EARTHWORK, paragraph 3.2.3 of these specifications

3.5. RIPRAP

3.5.1 General

Riprap shall be placed on the bedding material layer at a thickness of 450 mm at the flared end section at the influent end of the 1050 mm RCP culvert and at the effluent end of the existing 0.914 m x 0.610 m box culvert and 914 mm at the outfall control structure of the 1050 mm RCP culvert, within the limits shown on the drawings or otherwise required by the Contracting Officer. Either boulders or quarried rock may be used for riprap if conforming to the applicable requirements of paragraph Quality Control.

3.5.2 Placement

Stone for "riprap" shall be placed on the bedding layers in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids, and shall be constructed within the specified tolerance to the lines and grades shown on the drawings or staked in the field. A tolerance of plus 50 mm (2 inches) or minus 50 mm (2 inches) from the slope lines and grades shown on the drawings will be allowed in the finished surface of the riprap, except that either extreme of such tolerance shall not be continuous over an area greater than 18.58 square meters (200 square feet). Riprap shall be placed to its full course thickness at one operation and in such a manner as to avoid displacing the bedding material. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified in paragraph 2.1.4 above. The finished

riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Placing riprap in layers will not be permitted. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of the various sizes will not be permitted. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source; by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain a reasonably well graded distribution of stone sizes as specified above. The placement or rearrangement of stones for stone protection shall not disturb the geotextile filter fabric specified in paragraph 3.2. Any filter fabric disturbed by the placement or rearrangement of the stone protection shall be replaced by the Contractor at no additional cost to the Government. The Contractor shall maintain the riprap protection until accepted and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the drawings.

PLATE II

LMVD STANDARD TEST METHOD FOR GRADATION

Select a representative sample (Note #1), weigh and dump on hard stand.

Select specific sizes (see example) on which to run "individual weight larger than" test. (See Note #2). Procedure is similar to the standard aggregate gradation test for "individual weight retained".

Determine the largest size stone in the sample. (100% size)

Separate by "size larger than" the selected weights, starting with the larger sizes. Use reference stones, identified weights, for visual comparison in separating the obviously "larger than" stone. Stones that appear close to the specific weight must be individually weighed to determine size grouping. Weigh each size group, either individually or cumulatively.

Paragraph D above will result in "individual weight retained" figures. Calculate individual percent retained (heavier than) and cumulative percent retained and cumulative percent passing (lighter than). Plot percent passing, along with the specification curve on ENG Form 4055.

NOTES

1. Sample Selection. The most important part of the test and the least precise is the selection of a representative sample. No "standard" can be devised; larger quarry run stone is best sampled at the shot or muck pile by given direction to the loader; small graded riprap is best sampled by random selection from the transporting vehicles. If possible, all parties should take part in the sample selection and agree before the sample is run that the sample is representative.

2. Selection of Size for Separation. It is quite possible and accurate to run a gradation using any convenient sizes for the separation, without reference to the specifications. After the test is plotted on a curve, then the gradation limits may be plotted. Overlapping gradations with this method are no problem. It is usually more convenient, however, to select points from the gradation limits, such as the minimum 50% size, the minimum 15% size, and one or two others as separation points.

PLATE III

EXAMPLE GRADATION- SPECIFICATIONS

| Stone Weight in Kilograms | Percent Finer by Weight |
|---------------------------|-------------------------|
| 40.8 – 18.1 | 100 |
| 18.1 – 9.1 | 50 |
| 9.1 – 2.3 | 15 |

EXAMPLE GRADATION-WORKSHEET

| Stone Size (kgs) | Weight Retained | Individual % Retained | Cumulative % Ret. | % Pass | Specification % Finer by wt |
|------------------|-----------------|-----------------------|-------------------|--------|-----------------------------|
| 40.8 | 0 | 0 | - | 100 | |
| 18.1 | 4354.5 | 30 | 30 | 70 | 100 |
| 9.1 | 5080.2 | 35 | 65 | 35 | 50 |
| 2.3 | 3628.7 | 25 | 90 | 10 | 15 |
| < 2.3 | 1451.5 | 10 | 100 | - | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total Weight | 14515 kgs | | | | |

Remarks: LARGEST STONE SIZE = 35.4 KGS

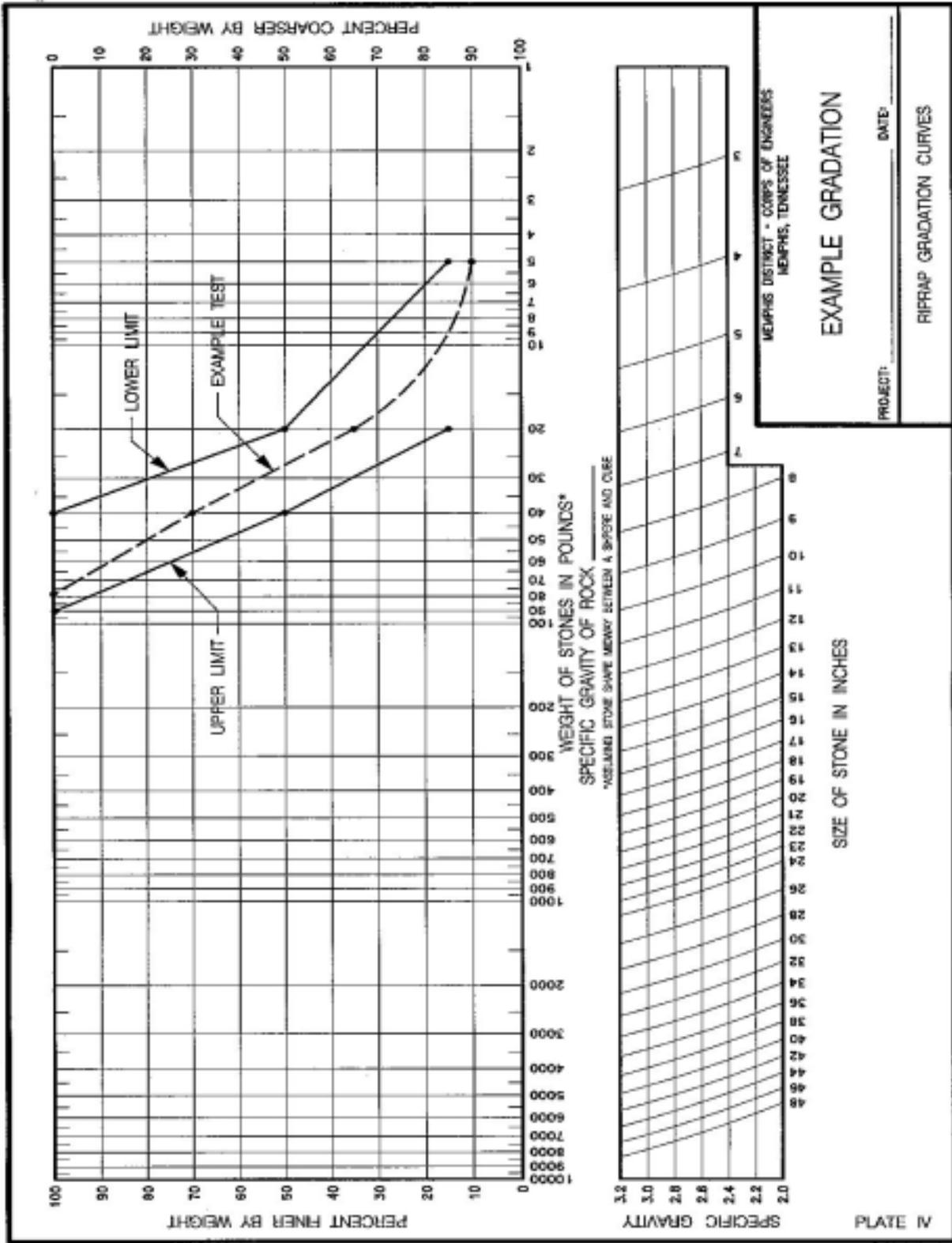


PLATE V
GRADATION TEST DATA SHEET

Quarry _____ Stone Tested _____

Date of Test _____ Testing Rate _____

TEST REPRESENTS

| Contract No. | District | Tonne |
|--------------|----------|-------|
| | | |
| | | |
| TOTAL | | |

GRADATION

| Stone Size (Kilograms) | Weight Retained | Individual % Retained | Cumulative % Ret. | Cumulative % Pass | Specification % Finer by wt |
|---------------------------|--------------------|--------------------------|----------------------|----------------------|--------------------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total Weight | | | | | |

Remarks: _____

I Certify that the above stone sample is representative of the total tonnage covered by this test report.

Contractor Representative _____

Government Representative _____

End of Section

DIVISION 2 - SITEWORK

SECTION 02720

STORM-DRAINAGE SYSTEM

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SECTION 02720

STORM-DRAINAGE SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION
OFFICIALS (AASHTO)

| | |
|--------------|---|
| AASHTO M 36 | Standard Specification for Corrugated Steel pipe, metallic coated |
| AASHTO M 170 | (1993) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe |
| AASHTO M 198 | (1993) Joint for Circular Concrete Sewer And Culvert Pipe Using Flexible Watertight Gaskets |
| AASHTO M 274 | Standard Specification for Steel Sheet Aluminum-Coated (Type 2) for Corrugated Steel Pipe |
| AASHTO T 280 | Concrete Pipe, Sections, or Tile |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---------------|--|
| ASTM C 76 | (1990) Reinforced Concrete Culvert Storm Drain; and Sewer Pipe |
| ASTM A 139 | (1993) Electric – Fusion (Arc)-Welded Steel Pipe |
| ASTM C 877-94 | (1994) External Sealing Band for Noncircular Concrete Sewer, Storm Drain; and Culvert Pipe |

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Instructions

Placing Pipe; FIO.

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation including collar installation procedures.

SD-08 Statements

Emergency Closure Plan; GA.

Statement of plan for emergency closure of the replacement culvert in the event of imminent flooding of the construction site from river flooding.

SD-14 Records

Pipe for Culverts and Storm Drains; FIO

Samples of the following materials before work is started; pipe gaskets and joint material, and exterior collar material.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials, plastic materials, and exterior collars shall be protected from exposure to the direct sunlight over extended periods.

1.3.2 Handling

Materials shall be handled in such a manner as to ensure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 ENCASUREMENT PIPE

Encasement pipe for this project shall be of the diameter adequate to provide for the proper installation of the 1050-mm Reinforced Concrete Pipe culvert and Bored Manhole shown on the contract drawings and described in these specifications. The encasement pipe shall be smooth wall, welded steel pipe conforming to the latest requirements of ASTM A139 Grade B. The contractor shall furnish and install encasement pipe of ample wall thickness to withstand all structural loading of whatever nature due to the site/or soil conditions and the method of installation. All encasement pipe shall be new. Used pipe will not be allowed. The MINIMUM wall thickness for the various nominal diameters shall be as follows:

| | |
|------------------------|-------------------------|
| 1220 mm (48") diameter | 19 mm (3/4") thickness |
| 1370 mm (54") diameter | 19 mm (3/4") thickness |
| 1525 mm (60") diameter | 19 mm (3/4") thickness |
| 1675 mm (66") diameter | 25 mm (1") thickness |

Use of the minimum wall thickness shall not relieve the Contractor from any responsibility to provide an acceptable installation of the encasement pipe to the line and grade and all other stipulations required by the contract drawings or specified herein.

2.2 CORRUGATED STEEL PIPE FOR DRILLED DROP INLETS

Corrugated steel pipe and coupling bands shall meet the requirements of AASHTO M 36, Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewer and Drains. Pipes shall be fabricated from aluminum-coated steel sheet which meets the requirements of AASHTO M 274, Standard Specification for Steel Sheet, Aluminum-Coated (Type 2) for Corrugated Steel Pipe.

2.3 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts shall be of the sizes indicated on the plans and shall be specified herein.

Reinforced concrete pipe shall be ASTM C 76. Class V. The concrete pipe shall be tongue and groove. Test shall be conducted according to AASHTO T 280.

The manufacture and furnishing of circular pipe shall be according to the provisions of AASHTO M 170 with a minimum B wall thickness. Joints shall be sealed with bitumen/butyl rubber plastic gaskets complying with AASHTO M 198, Type A or B, except that Type B shall have a Specific Gravity of 1.20 to 1.45.

Corrugated steel pipe for the temporary cofferdam shall be 762 mm diameter Corrugated Metal Pipe (CMP) Helical Galvanized (67.73 x 12.7 mm) culvert. The Contractor shall furnish and install the 762 mm CMP culvert of ample wall thickness to withstand all structural loading of

whatever nature due to the site/or soil conditions and the method of installation. Minimum wall thickness shall be 1.625 mm (0.064"). Use of the minimum wall thickness shall not relieve the Contractor from any responsibility to provide an acceptable installation of the 0.762 mm pipe to all stipulations required by the contract drawings or specified herein.

2.4 FLAP GATE FOR 766-MM CORRUGATED METAL PIPE CULVERT

The flap gate shall be designed to allow outflow and prevent backflow for maximum seating heads of 10 feet. The frame shall be cast iron of spigotback design with seating surface inclined from vertical as a minimum of 2 ½ degrees to assure positive closure. The cast iron cover, with dished or domed construction to withstand maximum seating head, shall have machined seats, and be attached in such a manner as to allow proper seating and full opening of cover. Safety bar or built in stops shall be provided to prevent the cover from rotating sufficiently to become wedged in the open position.

The linkage system shall be of the double pivoted type, attached to fixed, bronze bushed, pivot points on cover and frame. Hinge links shall be structural steel, which along with assembly hardware shall be galvanized.

The cast iron frame and cover shall be coated with the manufacturer's standard shopcoat paint. Galvanized steel does not require further finish.

The following material specifications shall apply to the described flap gate:

- Frame and Cover – Cast Iron per ASTM A-126, Class B
- Hinge Link – Structural Steel per ASTM A-36, Galvanized per ASTM A-123
- Assembly Hardware – Steel per ASTM A-307, Galvanized per ASTM A-153
- Bronze Bushing – Commercial Bronze

2.5 EXTERIOR PIPE JOINT COLLARS

Exterior pipe joint collars shall be MacWrap Exterior Joint Sealer as manufactured by Mar-Mac Manufacturing Company or approved collars meeting ASTM Standards Specification C-877-94 (Type II). The collar shall be made of two layers. The bottom layer (adjacent to pipe) shall be made of a tough, woven polypropylene fabric with a thick rubberized mastic coating with a peelable protective paper that is removed when the collar is applied to the pipe. The outer layer shall consist of an impervious polyethylene with rubberized mastic that is bonded to the bottom layer. Between layers, steel straps sheathed in tubes shall be provided to allow the straps to slip freely and tighten around the pipe. The ends of the two layers shall be off-set to allow the bottom layer to overlap itself when applied to the pipe steel straps shall be completely covered by the top layer of collar.

2.6 PRECAST CONCRETE FLARED END SECTION (F.E.S.)

Precast concrete flared end section shall be of the size indicated on the plans and shall be specified herein.

Precast concrete flared end section shall conform to the applicable requirements of AASHTO M-170 Class III, Wall B reinforced concrete pipe.

PART 3 EXECUTION

Prior to the commencement of construction through or on the riverside of the existing levee, the Contractor shall submit a plan for the emergency closure of the pipe should a high water event occur. The plan shall demonstrate that the Contractor has at the site all equipment, material, and manpower to seal the pipe with a water-tight steel plate and then cover the pipe with 5 feet of compacted CL/CH material. The Contractor shall include in the emergency closure plan, details on backflooding the excavation area within the cofferdam should the dewatering system fail or overtopping of the cofferdam is imminent.

3.1 CULVERT INSTALLATION BY EXCAVATION

3.1.1 Excavation

For pipes installed by open cut, excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable portions of Section 02225 EARTHWORK and the requirements specified below.

3.1.2 Trenching

Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to over excavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in paragraph 3.6 BACKFILLING FOR CULVERTS. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Government.

3.2 BEDDING FOR CULVERTS

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. The bottom of the trench shall be shaped as shown on the plans to conform to the bottom of the pipe to afford a uniform firm bed. Selected granular material as shown on the contract documents shall be compacted with hand-held compaction devices.

3.3 PLACING CULVERTS

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. The pipe laying shall begin at the downstream end and the groove end of concrete pipe shall be placed facing upstream. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced. Pipe that is not true in alignment or which shows settlement after laying shall be corrected by the Contractor at no additional cost to the Government.

3.4 JOINING PIPE

The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Pipe protruding through structure walls shall be cut off to integrate with sluice gate wall thimbles.

All surfaces on which joint seal gaskets may bear shall be smooth, free of spalls, cracks, fractures, and imperfections that would adversely affect the performance of the joint. A primer shall be applied if recommended by the manufacturer.

The following procedure shall be used for bitumen/butyl plastic gaskets,. The protective wrapping shall be removed from one side of the gasket. The gasket shall be placed and pressed firmly to the surface of the pipe joint around the entire circumference of the joint. The remaining protective wrapping shall be removed and the pipe forced into connection until material fills the joint space.

To ensure an even and well-filled joint, the final joining of the pipe shall be accomplished by either pushing or pulling, by approved mechanical means, each joint of the pipe as it is laid. In cold weather, when directed, the joint material shall be warmed in a hot water bath, or by other approved methods, to the extent required to keep the material pliable for placement without breaking or cracking.

3.5 APPLICATION OF EXTERIOR JOINT COLLARS

All pipe joints shall be installed with an exterior pipe joint collar as specified in paragraph 2.5 EXTERIOR PIPE JOINT COLLAR and in accordance with manufacturer's recommendations.

After removing the protective paper, the band shall be placed around the pipe, mastic side to the pipe and spanning the joint, with the overlap at the top of the pipe. Steel straps shall be secured with proper tools. The closing flap shall cover all remaining exposed steel straps. Collar width

shall correspond to type and size of pipe used.

3.6 BACKFILLING FOR CULVERTS

3.6.1 Backfilling Pipe in Trenches

3.6.1.1 Initial Backfill

After the pipe has been properly bedded, selected granular material or satisfactory material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 150 mm (6 inches) in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 300-mm (12 inches) above the top of the pipe.

3.6.1.2 Final Backfill

The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 150 mm. (6 inches.) Tests for density will be made as necessary to ensure conformance to the compaction requirements as specified in Section 02225 EARTHWORK paragraph 3.5 BACKFILL. Where it is necessary in the opinion of the Contracting Officer, any sheeting or portions of bracing used shall be left in place and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.6.2 Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.6.3 Compaction

Compaction of material shall be as specified in Section 02225 EARTHWORK paragraph 3.5 BACKFILL.

3.6.4 Determination of Density

Density shall be determined in accordance with Section 02225 EARTHWORK 3.14 paragraph TESTING.

3.7 MEASUREMENT AND PAYMENT

CULVERT INSTALLATION BY EXCAVATION - Payment will be made at the lump sum prices for the items shown on the Plans and described in these specifications as "610-mm Dia. Reinforced Concrete Pipe". Such payment shall be total compensation for furnishing and installing the drainage pipe as shown on the Plans and described herein and all other items of work or materials needed for a complete installation.

3.8 CULVERT INSTALLATION BY BORING AND JACKING

3.8.1 General

All encasement pipe shall be installed by the boring and jacking method unless called out otherwise herein and/or on the Plans. After execution of a Construction Contract, the Contractor may submit an alternate method of encasement installation to the Owner for review and possible approval. Any alternate method shall be submitted in writing and shall be supported by a detailed description of how the Contractor will achieve a proper installation and an itemized price breakdown of the proposed alternate. Any alternative plans shall be submitted at least two (2) weeks before such work begins.

3.8.2 Installation

Installation of the encasement shall be carried out in such manner that there will be no settlement of the ground surface above the encasement. The Contractor shall take all precautions to prevent caving of the soils ahead of the pipe. During encasement installation, the Contractor shall use all care to minimize annular space (voids) between the outside of the encasement pipe and the surrounding ground. Therefore, the outside of encasement pipe installed by boring and jacking shall be pressure grouted to eliminate voids according to Paragraph 3.8.2.1, unless excepted therein.

The Contractor shall inspect the locations where the encasement pipe and bore pits are to be installed and familiarize himself with the conditions under which the work will be performed and with all necessary details for the orderly prosecution of the work. The omission of any details in the Plans and/or herein for installation of the encasement and carrier pipe shall not relieve the Contractor of full responsibility for the proper execution and integrity of the work.

The Contractor shall satisfy himself of soils condition by any means he deems necessary, i.e., exploratory boring or exploratory pit excavations at bore ends. Any such exploratory work shall be done in such manner as to not jeopardize railroad or highway roadbeds and rights-of-way and shall be backfilled and cleaned up to the satisfaction of the rights-of-way owner. The Contractor shall be responsible to obtain his own permission and to furnish bonds, etc. as may be required by private landowners or the public authority having jurisdiction at the site of any such exploratory work.

The Contractor shall perform all excavation required to complete the work regardless of the material encountered. Excavation from the access shafts (bore pits) in excess of that required to backfill the access shafts and open cut portion of the line shall be disposed of by the Contractor outside the limits of the construction site. Pits and trenches shall be properly shored, sheeted, and

braced according to Paragraph 3.8.2.2.

Any damage to the encasement pipe coating during shipment or handling shall be repaired by the Contractor. Boring and jacking of smooth wall pipe shall be by competent supervisors and workmen specializing in this type of work and shall be the responsibility of the Contractor.

The encasement alignment shall be maintained within a tolerance of 2.5 mm (0.10') of the tangent line and grade.

3.8.2.1 Pressure Grouting

During installation of the encasement pipe, care shall be exercised to prevent voids between the encasement and the surrounding ground.

On encasement pipes larger than 305 mm (12") nominal diameter, the annular space between the encasement pipe and the ground shall be pressure grouted to eliminate all voids. Encasement pipes smaller than 305 mm (12") shall also be grouted if so directed by the Contracting Officer depending on soil conditions at the bore site identified at the time of encasement installation.

When grouting encasement pipes of such diameter that entry by a worker is possible, the grout shall be injected through the encasement pipe wall through 38 mm (1.5") diameter holes from the inside at one location for each 1.5 meter (5.0-foot) linear interval over the entire length of the encasement pipe. The sequence for grout injection locations shall be as follows:

| <u>Locations (1.5M (5') Spaces)</u> | <u>"Clock" Position</u> |
|---|-----------------------------|
| 1st | 12 O'clock |
| 2nd | 3 O'clock |
| 3rd | 12 O'clock |
| 4th | 9 O'clock |
| 5th | 12 O'clock |

Repeat 2nd through 5th locations at 1.5 meter (5-foot) intervals for each location to end of the encasement pipe.

NOTE: THE CONTRACTOR SHALL BE RESPONSIBLE TO SEE THAT ALL REQUIREMENTS OF OSHA CONCERNING ENTRY OF WORKERS INTO CONFINED SPACES ARE FOLLOWED.

For encasement pipes too small to be entered for grouting as addressed above, the annular space may be pressure grouted by means of an external grout pipe attached to the outside of the encasement pipe. After the encasement pipe (and the grout pipe) is in place, the grout pipe shall be withdrawn as the grout is introduced into the annular space.

3.8.2.2 Bore Pits

The access shafts (bore pits) for encasement installation shall be rectangular in plan view,

approximately 6M x 3M (20' x 10'), with the longer dimension being in the direction of the encasement pipe. The Contractor shall provide a bore pit(s) of sufficient size to safely perform all work for the installation of encasement pipe, carrier pipe, and all appurtenances. The bore pits shall be sheeted, shored, and braced on all sides in as addressed herein. Sheeting shall be timber or steel piling of ample strength to safely withstand all structural loading of whatever nature due to site and soil condition. The top of the sheeting shall be at a minimum elevation equal to the natural ground line as it existed prior to construction. **THE CONTRACTOR SHALL BE RESPONSIBLE TO SEE THAT ALL REQUIREMENTS OF OSHA CONCERNING ENTRY OF WORKERS INTO CONFINED SPACES ARE FOLLOWED.** Diversion of drainage or dewatering of pits during construction shall be provided by the Contractor, as necessary, at no additional cost to the Government.

3.9 JOINING PIPE

The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

All surfaces on which joint seal gaskets may bear shall be smooth, free of spalls, cracks, fractures, and imperfections that would adversely affect the performance of the joint. A primer shall be applied if recommended by the manufacturer.

The following procedure shall be used for bitumen/butyl plastic gaskets. The protective wrapping shall be removed from one side of the gasket. The gasket shall be placed and pressed firmly to the surface of the pipe joint around the entire circumference of the joint. The remaining protective wrapping shall be removed and the pipe forced into connection until material fills the joint space.

To ensure an even and well-filled joint, the final joining of the pipe shall be accomplished by either pushing or pulling, by approved mechanical means, each joint of the pipe as it is laid. In cold weather, when directed, the joint material shall be warmed in a hot water bath, or by other approved methods, to the extent required to keep the material pliable for placement without breaking or cracking.

A sufficient length of carrier pipe shall extend beyond each end of the encasement pipe to facilitate the installation of the "1050-mm Precast Flared End Section" and the "Outlet Structure".

3.10 APPLICATION OF EXTERIOR JOINT COLLARS

All pipe joints shall be installed with an exterior pipe joint collar as specified in paragraph 2.5 EXTERIOR PIPE JOINT COLLAR and in accordance with manufacturer's recommendations.

After removing the protective paper, the band shall be placed around the pipe, mastic side to the pipe and spanning the joint, with the overlap at the top of the pipe. Steel straps shall be secured with proper tools. The closing flap shall cover all remaining exposed steel straps. Collar width shall correspond to type and size of pipe used.

3.11 CARRIER PIPE IN ENCASUREMENT

Installation of the carrier pipe in the encasement shall be accomplished in such manner that neither the pipe nor the encasement is damaged. Care must be exercised to assure that the joints of the pipe are not over-deflected or pulled out during the process. The pipe shall be jointed and pushed or jacked through the encasement. Cables, chains, jacks or other equipment or devices used shall not be in direct contact with the pipe unless thoroughly padded.

Skids, chocks, and hold-down jacks shall be provided for stability during installation and after the pipe is in place. After the carrier pipe has been installed in the encasement pipe, the annular space between the encasement pipe and carrier pipe shall be pressure grouted both ends of the encasement pipe shall be tightly sealed as shown on the Plans.

3.12 MEASUREMENT AND PAYMENT

Encasement Pipe (Bored) and Carrier Pipe - Payment will be made at the lump sum prices for the items shown on the Plans and described in these specifications as “1050-mm Dia. Reinforced Concrete Pipe” and “1050-mm Dia. Precast Flared End Section”. PAYMENT WILL BE MADE FOR THE COMPLETE INSTALLATION OF THE ENCASEMENT PIPE AND SHALL INCLUDE INSTALLING THE CARRIER PIPE INSIDE THE ENCASEMENT. Such payment shall be total compensation for furnishing and installing the encasement pipe, the carrier pipe within the encasement pipe, and flared end section as described herein and all other items of work or materials needed for a complete installation. No separate measurement or payment will be made regarding the item “Encasement Pipe (Bored) and Carrier Pipe” for bore pit or retrieval pit excavation, sheeting, shoring, etc., or fittings, skids, hold-down jacks, straps, or other appurtenances, or for sealing, pressure grouting, venting, marking, or protecting the encasement pipe unless outlined herein. Pressure grouting required for this item is not included in the Bid Item 019 titled “Pressure Grouting”

End of Section

DIVISION 2 - SITE WORK

SECTION 02411

METAL SHEET PILING

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SECTION 02411

METAL SHEET PILING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 6/A 6M (1996b) General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

ASTM A 328/A 328M (1993a: R1996) Steel Sheet Piling

1.2 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Drawings

Metal Sheet Piling; FIO.

Detail drawings for sheet piling shall show complete piling dimensions and details, driving sequence and location of installed piling. Detail drawings shall include details and dimensions of templates and other temporary guide structures for installing piling. Detail drawings shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

SD-07 Schedules

Pile Driving Equipment; GA.

Complete descriptions of sheet piling driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

SD-08 Statements

Pulling and Redriving; GA.

The proposed method of pulling sheet piling shall be submitted and approved prior to pulling any piling.

SD-09 Reports

Interlocked Joint Strength; GA.

The Contracting shall furnish a certificate showing that piling furnished has the required interlock strength as determined by test results of two representative test specimens, approximately 3 inches long, per heat.

Materials Tests; FIO.

Certified materials tests reports showing that sheet piling and appurtenant metal materials meet the specified requirements shall be submitted for each shipment and identified with specific lots prior to installing materials. Material test reports shall meet the requirements of ASTM A 6/A 6M.

SD-18 Records

Driving; FIO.

Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling.

1.3 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Steel for sheet piling shall conform to the requirements of ASTM A 328. Sheet piling shall be of the type indicated on the drawings, have a nominal web thickness of not less than 9.5 mm and be of a design such that when in place they will be continuously interlocked throughout

their entire length. All piling shall be provided with standard pulling holes located approximately 100 mm below the top of the pile, unless otherwise shown or directed. Piling shall have the properties equivalent to those listed in the following table:

PROPERTIES OF SECTIONS

Section Modulus Per Lin.M. of wall(cm-cu)

PZ 22 973

Cold-rolled sections with equivalent properties may be used.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified and in Section 05101 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.2.1 Materials Tests

Materials tests shall conform to the following requirements. Sheet piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site. Testing of sheet piling for mechanical properties shall be performed after the completion of all rolling and forming operations. Testing of sheet piling shall meet the requirements of ASTM A 6/A 6M.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment

Pile driving equipment shall conform to the following requirements.

3.1.1.1 Driving Hammers

Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers shall range from 6775 to 13558 joules or as recommended by the manufacturer for the piling weights and subsurface materials to be encountered. The hammer selected by the Contractor shall be capable of performing the job.

3.1.2 Placing and Driving

3.1.2.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown. Pilings shall be placed plumb with out-of-plumbness not exceeding 10 mm per meter of length and true to line. Temporary wales, templates, or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. At least two templates shall be used in placing the cut-off piling. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.1.2.2 Driving

Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths. Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. A protecting cap shall be employed in driving when using impact hammers to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Adequate precautions shall be taken to insure that pilings are driven plumb. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the piling next to the one being driven tends to follow below final elevation it may be pinned to the next adjacent piling. If obstructions restrict driving a piling to the specified penetration the obstructions shall be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed to insure continuity of the cut-off wall. Pilings shall be driven to depths shown and shall extend up to the elevation indicated for the top of pilings. A tolerance of 50 mm above the indicated top elevation will be permitted. Pilings shall not be driven within 30 meters of concrete less than 7 days old.

3.1.3 Cutting-Off and Splicing

Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation. Pilings driven below the required top elevation and pilings damaged by driving and cut off to permit further driving shall be extended as required to reach the top elevation by splicing when directed at no additional cost to the Government. Pilings adjoining spliced pilings shall be full length unless otherwise approved. The tops of pilings excessively battered during driving shall be trimmed when directed at no cost to the Government. Piling cut-offs shall become the property of the Contractor and shall be removed from the site.

3.1.4 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.1.5 Pulling and Redriving

In the pulling and redriving of piles as directed, the Contractor shall pull selected pilings after driving to determine the condition of the underground portions of pilings. Any piling so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition shall be redriven when directed.

End of Section