

US Army Corps  
of Engineers  
Baltimore District

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# CONSTRUCTION SPECIFICATIONS

## **WYOMING VALLEY LEVEE RAISING - PHASE IIB**

### **WILKES-BARRE & HANOVER TOWNSHIPS, PENNSYLVANIA**

INVITATION NO. **DACW31-03-B-0010**

CONTRACT NO.

DATE: **MAR 03, 2003**

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SECTION 01000

ADMINISTRATIVE REQUIREMENTS  
01/01

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Title Evidence

Proof of purchase for equipment and/or materials.

Invoice Copies

Proof of rental equipment costs.

Payment Evidence

Proof of full payment.

Photographs

SD-03 Product Data

Cost or Pricing Data

Proof of actual equipment costs.

Equipment Data

An itemized list of serial/model numbers and equipment installed by the Contractor under this contract..

SD-05 Design Data

Progress Schedule; G AR.

A schedule that shows the manner in which the Contractor intends to prosecute the work.

SD-10 Operations and Maintenance Data

## O and M Data

A list of proposed maintenance and instruction manuals that is mainly used for but not limited to customized equipment.

## 1.2 PROGRESS SCHEDULING AND REPORTING (DEC 1998)

## 1.2.1 Progress Schedule

See Section 01320, Project Schedule.

## 1.2.2 Software Package

The Contractor shall utilize an industry recognized scheduling software package to implement the requirements of Section 01320 PROJECT SCHEDULE. The program and data must be IBM PC compatible in a Window environment. These requirements are not intended to restrict the Contractors selection of an automated scheduling system but to establish a format which will allow use of the same program with government computers and automated information systems. The Contractor will provide at least one program installation and maintenance on government hardware complete with all program and data files. Such installation shall be maintained for the duration of the project until fiscal completion and shall allow analysis and of the project schedule by government personnel or agents.

## 1.2.3 Additional Scheduling Requirements

The Contractor shall incorporate the following requirements in addition to those specified in Section 01320 PROJECT SCHEDULE.

## 1.3 PAYMENTS TO CONTRACTORS: (NOV 1976)

For payment purposes only, an allowance will be made by the Contracting Officer of 100 percent of the invoiced cost of materials or equipment delivered to the site but not incorporated into the construction, pursuant to the Contract Clause entitled "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS". The Contracting Officer may also, at his discretion, take into consideration the cost of materials or equipment stored at locations other than the jobsite, when making progress payments under the contract. In order to be eligible for payment, the Contractor must provide satisfactory evidence that he has acquired title to such material or equipment, and that it will be utilized on the work covered by this contract. Further, all items must be properly stored and protected. Earnings will be computed using 100% of invoiced value. (CENAB-CO-E)

## 1.4 IDENTIFICATION OF EMPLOYEES: (OCT 1983)

Each employee assigned to this project by the Contractor and subcontractors shall be required to display at all times, while on the project site, an approved form of identification provided by the Contractor, as an authorized employee of the Contractor/subcontractor.(CENAB)

## 1.5 PURCHASE ORDER: (SEP 1975)

One readable copy of all purchase orders for material and equipment, showing firm names and addresses, and all shipping bills, or memoranda of shipment received regarding such material and equipment, shall be furnished the appointed Contracting Officer's Representative as soon as issued. Such orders, shipping bills or memoranda shall be so worded or marked that all material and each item, piece or member of equipment can be definitely identified on the drawings. Where a priority rating is assigned to a contract, this rating, the required delivery date, and the scheduled shipping date shall also be shown on the purchase order. At the option of the Contractor, the copy of the purchase order may or may not indicate the purchase price. (CENAB-CO-E)

1.6 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (EFARS 52.0231.5000 (OCT 1995))

(a) This clause does not apply to terminations. See 52.249-5000, Basis for settlement of proposals and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable conditions owned or controlled and furnished by a contractor or subcontractor at any tier shall be based on actual costs data for each piece of equipment or groups of similar serial and services for which the government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs can not be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP1110-1-8 Construction Equipment Ownership and Operating Expenses Schedule, Region East. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d) (ii) and Far 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established proactive of leasing the same or similar equipment to unaffiliated leasees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the contracting officer shall request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet. CENAB-CT/SEP 95 (EFARS 52.231-5000)

1.7 REAL PROPERTY EQUIPMENT DATA: (APR 1975)

At or before the time of completion of the contract, the Contractor shall submit to the Contracting Officer a complete itemized list, including serial and model number where applicable, showing the unit retail value of each Contractor furnished item of mechanical, electrical and plumbing equipment installed by the Contractor under this contract. For each of the items which is specified herein to be guaranteed for a specified period from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship, the following information shall be given: the name, address and telephone number of the Subcontractor, Equipment Supplier, or Manufacturer originating the guaranteed item. The list shall be accompanied by a copy of the specific guarantee document for each item which is specified herein to be guaranteed if one had been furnished to the Contractor by the Equipment Supplier or Manufacturer. The Contractor's guarantee to the Government of these items will not be limited by the terms of any manufacturer's guarantee to the Contractor. Baltimore District NADB Form 1019 may be utilized for the itemized listing and will be made available to the Contractor upon request. (CENAB-CO-E)

1.8 O and M DATA: (JUL 1979)

The requirements for furnishing operating and maintenance data and field instruction are specified elsewhere in the specifications. The Contractor shall submit to the Contracting Officer, at a time prior to the 50% project completion time, a list of proposed maintenance and instruction manuals to be furnished the Government and the scheduled dates of all required field instructions to be provided by Contractor furnished personnel or manufacturer's representatives. All maintenance and instruction manuals must be furnished to the Contracting Officer at least 2 weeks prior to the scheduled dates of any required Contractor furnished field instructions or at least one month prior to project completion if no Contractor furnished field instructions are required. (CENAB)

1.9 MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the work performed in this Section 01000, ADMINISTRATIVE REQUIREMENTS specified herein and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor, and shall be included in the overall cost of the work.

1.10 NEGOTIATED MODIFICATIONS: (OCT 84)

Whenever profit is negotiated as an element of price for any modification to this contract with either prime or subcontractor, a reasonable profit shall be negotiated or determined by using the OCE Weighted Guidelines method outlined in EFARS 15.902. (Sugg. NAB 84-232)

1.11 PHOTOGRAPHS

1.11.1 Photographic Coverage (Standard)

(SEP 85) The Contractor shall provide photographic coverage under the contract. These services shall be for ten commercial grade color photographs every three months from the beginning of the contract until

acceptance of the completed work. These photographs shall be in 8" x 10" size and shall be taken at intervals and at the place designated by the Contracting Officer. Negatives from all of the above photographs shall be given to and become the property of the Government. (CENAB-CO)

#### 1.11.2 Photographic Coverage (Digital)

Digital photographs shall be taken monthly at locations and times designated by the Contracting Officer. Photographs shall be provided on CD-ROM.

#### 1.12 PARTNERING: (NOV 92)

In order to most effectively accomplish this contract, the Government is willing to form a cohesive partnership with the Contractor and its subcontractors. This partnership would strive to draw on the strengths of each organization in an effort to achieve a quality project done right the first time, within budget and on schedule. This partnership would be bilateral in make-up and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in contract price. (CENAB-EN-DT)

#### 1.13 PERMITS

The permits listed below have been obtained by the Government or are in the approval process and may require additional action by the Contractor to become complete. After final approvals by the respective state agencies are received, the Government will furnish approval letters and permits to the Contracting Officer who will furnish the Contractor all such permits before or during construction. The Contractor shall abide by all permit requirements.

##### 1.13.1 Environmental Permits

The permits listed below have been obtained by the Government. A copy of each permit is attached at the end of this section.

##### 1.13.1.1 Erosion and Sediment (E&S) Pollution Control Plans

Letter of plan review adequacy, dated #####.

##### 1.13.1.2 Commonwealth of Pennsylvania

401 Certification, dated March 20, 1995.

##### 1.13.1.3 National Pollutant Discharge Elimination System (NPDES) Permit

NPDES Permit No. PAR10R168. The Contractor will become a Co-Permittee upon award of the contract and shall be required to sign agreement.

## 1.13.2 Transferee/Co-Permittee Application

The Contractor, upon receipt of Notice to Proceed, shall submit a Transferee/Co-Permittee Application for coverage under the NPDES permit with a Transfer Agreement to the Luzerne County Conservation District. This application shall be completed as directed by the Contracting Officer with regard to whom shall be the permittee and/or co-permittee (a copy of an application is attached at the end of this section).

## 1.13.3 Notice of Termination (NOT)

The Contractor, shall, upon completion of the project, submit a Notice of Termination (NOT) to the Luzerne County Conservation District (a copy of an application is attached at the end of this section).

## 1.13.4 Highway Occupancy Permits

## 1.13.4.1 Pennsylvania Department of Transportation (PADOT) Highway Occupancy (HOP) Permits

The following permits have been applied for and approved:

- a. Highway Occupancy permit #04024395 for access at North Street (SR1011) at Courthouse and under Market Street (SR1009).

## 1.13.5 Copies of Permits

Copies of the approved permit and permit extension are attached at the end of this section. Copies of the permit drawings are included at the end of the contract drawings.

## PART 2 PRODUCTS

NOT APPLICABLE

## PART 3 EXECUTION

NOT APPLICABLE

## ATTACHMENTS:

- a. Erosion and Sediment (E&S) Pollution Control Plan, Letter of plan review adequacy.
- b. Commonwealth of Pennsylvania 401 Certification.
- c. National Pollutant Discharge Elimination System (NPDES) Permit No. PAR10R168.
- d. Department of Transportation Highway Occupancy Permits.

-- End of Section --



**Luzerne Conservation District**  
P.O. Box 250, Smith Pond Road, Lehman, Pa. 18627  
Phone - (717) 674-7991 • Fax (717) 674-7989

January 5, 1999

Luzerne County Courthouse  
Luzerne County Flood Protection Authority  
200 North River Street  
Wilkes-Barre, PA 18711

Administrative Completeness Review  
Local Flood Protection Raising  
Wilkes-Barre City & Hanover Township  
NPDES General Permit  
Permit # PAR10R168

Enclosed is the above reference permit which authorizes the discharge of storm water from the construction activity described in the final erosion and sedimentation control plan and the permit application. Please ensure that the approved erosion and sedimentation control is implemented and available on the construction site at all times.

The Luzerne Conservation District reviewed the erosion and sedimentation control plan to determine whether it is adequate to satisfy the requirements of the Chapter 102, Erosion Control Rules and Regulations. The Luzerne Conservation District assumes no responsibility for the implementation of the plan as the proper construction and operation of the facilities contains in the plan.

Please read carefully Parts A, B, and C of the permit which details the terms and conditions of this authorization. Conservation District staff and/or representatives of the Department of Environmental Protection may inspect this earthmoving activity to determine compliance with applicable permit requirements, Chapter 92, 101, and 102 Rules and Regulations and the Clean Streams Law.

Permit requirements and federal regulations at 40 C.F.R S122.21(b) require that "When a facility or activity is owed by one person but is operated by another person, it is the operator's duty to obtain a permit." Please be advised that once a contractor has been selected for the project, they must either be added on as a co-permittee/transferee or have the permit responsibility transferred to them. The co-permittee/transferee form must be received by this office at least 30 days prior to the co-permittee/transferee action taking place. The enclosed form must be used to add the co-permittee/transferee.

Enclosed also is a Notice of Termination (NOT) form to be completed and filed with the District once construction activities have ceased and final stabilization has been achieved.

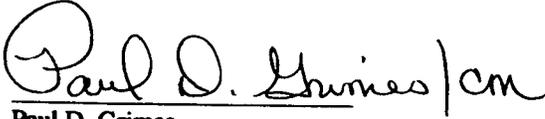
The Conservation District and the Regional Office; Soils and Waterways Section, must be notified by telephone or certified mail at least seven days prior to the start of construction.

A pre-construction conference is not requested.

This authorization does not relieve the applicant from applying for and obtaining any and all additional permits or approvals from local, state, or federal agencies for the construction activity described in this permit application.

Should there be any questions concerning this permit, please contact this office at (717) 674-7991 and refer to permit #PAR10R168.

Sincerely,

A handwritten signature in cursive script that reads "Paul D. Grimes" followed by a vertical line and the letters "cm".

Paul D. Grimes  
Resource Conservationist

Enclosure: Notice of Termination (NOT)  
Notice on Intent (NOI)  
Transferee/Co-Permittee Application  
Authorization to Discharge

bcc: Consultant  
Municipality  
Regional Office Soils and Waterways Section  
Luzerne Planning Commission  
Permit File



**Luzerne Conservation District**  
P.O. Box 250, Smith Pond Road, Lehman, Pa. 18627  
Phone - (717) 674-7991 • Fax (717) 674-7989

January 5, 1999

TO: Luzerne County Courthouse  
Flood Protection Authority  
200 North River Street  
Wilkes-Barre, PA 18711

RE: Local Flood Protection Raising

PROJECT NAME: Flood Protection Raising

PROJECT LOCATION: Wilkes-Barre City & Hanover Township

The Erosion & Sediment Pollution Control plan has been reviewed and is adequate to meet the requirements of PA Title 25, Chapter 102, Erosion Control and the erosion and sediment pollution control requirements of the Conservation District.

The Luzerne Conservation District has reviewed this plan solely to determine whether it is adequate to satisfy the requirements of 25 Pa. Code 102.1 et seq., the erosion control regulations of the Department of Environmental Protection and the erosion and sediment pollution control requirements of the district. By a determination that the plan is adequate to meet those requirements, neither the Conservation District nor the county assumes any responsibility for the implementation of the plan or the proper construction and operation of the facilities contained in the plan. The design, structural integrity, and installation of the control measures are the responsibility of the landowner and/or the earth-mover. Before any construction or earth-moving may begin the appropriate and necessary local, state, and federal permits must be secured from the agency having permitting authority.

A copy of the Erosion and Sedimentation Control Plan must be available at the site of the earth-moving activity during construction at all times until the project is completed.

Failure to begin earth-moving within two (2) years of the date of this letter will require a re-submission and review by the District.

If you have any questions regarding this or other projects, please contact our office at the above address and telephone number.

DATE: 1/5/99 Authorized Signature

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER QUALITY PROTECTIONAPPROVAL OF COVERAGE UNDER  
THE NPDES GENERAL PERMIT FOR DISCHARGES OF  
STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES (PAG-2)NPDES PERMIT NO: PA-R 10R168

In compliance with the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq. ("the Act") and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq., the Department of Environmental Protection hereby approves the Notice of Intent (NOI) submitted for coverage by:

## FACILITY NAME AND ADDRESS:

Luzerne County Flood Protection Authority  
Luzerne County Courthouse  
200 North River Street  
Wilkes-Barre, PA 18711

to discharge stormwater to the following receiving water(s):

subject to the Department's enclosed PAG-2 which incorporates all effluent limitations, monitoring and reporting requirements and other terms, conditions, criteria and special requirements for the discharge of stormwater from point sources composed entirely of stormwater associated, in whole or in part, with construction activity, as defined in this general permit, to surface waters of the Commonwealth, including to municipal separate storm sewers and non-municipal separate storm sewer.

APPROVAL TO DISCHARGE IN ACCORDANCE WITH THE TERMS AND CONDITIONS HEREIN MAY COMMENCE ON THE DATE OF THE APPROVAL OF COVERAGE, AND IS VALID FOR A PERIOD OF FIVE YEARS WHEN CONDUCTED PURSUANT TO SUCH TERMS AND CONDITIONS: COVERAGE MAY BE EXTENDED BY THE DEPARTMENT IF A TIMELY ADMINISTRATIVELY COMPLETE AND ACCEPTABLE NOI RENEWAL IS SUBMITTED TO THE DEPARTMENT AT LEAST 90 DAYS PRIOR TO DATE OF COVERAGE TERMINATION, UNLESS PERMISSION FOR SUBMISSION AT A LATER DATE HAS BEEN GRANTED BY THE DEPARTMENT.

Coverage Approval Date: 1/5/99Authorized by: [Signature]

COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER QUALITY PROTECTION

AUTHORIZATION TO DISCHARGE UNDER THE  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT FOR DISCHARGES OF STORMWATER ASSOCIATED WITH  
CONSTRUCTION ACTIVITIES (1997 AMENDMENT)

PAG-2

In compliance with the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq. (The "Act"), and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq., and rules and regulations promulgated thereto, the Department of Environmental Protection hereby authorizes, by general permit, subject to the terms and conditions contained herein, the discharge of stormwater from eligible new and existing discharges composed entirely of stormwater associated with construction activity to surface waters of the Commonwealth, including municipal separate storm sewers, and non-municipal separate storm sewers.

Notice of Intent (NOI) Submittal

1. GENERAL INFORMATION AND REQUIREMENTS

Persons proposing to discharge stormwater associated with construction activities and eligible persons proposing to expand the scope of previously authorized construction activity which discharges stormwater who wish to be covered by this general permit must file an administratively complete and acceptable Notice of Intent (NOI) with the reviewing entity at least 30 days prior to commencing the construction activity. The NOI shall be filed in accordance with the detailed instructions specified in the NOI Instruction package. The reviewing entity will assign a unique permit identification number to each NOI and will review the discharger's erosion and sediment control plan. General contractors must be included on the NOI, or be added to the permit as a co-permittee upon selection in accordance with Part B.1.d.

2. The following activities are not eligible for coverage under this permit:

- a. Discharges which contain hazardous pollutants, toxics, or any other substance which - because of its quantity, concentration, or physical, chemical, or infectious characteristics - may cause or contribute to an increase in mortality or morbidity in either an individual or the total population, or pose a substantial present or future hazard to human health or the environment when discharged into surface waters of the Commonwealth;
- b. Discharges which individually or cumulatively have the potential to cause significant adverse environmental impact;
- c. Discharges to waters for which NPDES general permit coverage is prohibited under 25 Pa. Code Chapter 92;
- d. Discharges which are not, or will not be in compliance with any of the terms or conditions of the general permit;
- e. Discharges from persons with a significant history of noncompliance;
- f. Discharges subject to categorical point source effluent limitations promulgated by EPA;
- g. Discharges which do not, or will not, result in compliance with applicable effluent limitations or water quality standards;
- h. Discharges from construction activities which the Department requires an Individual NPDES permit to ensure compliance with the Clean Water Act, the Clean Streams Law, or rules and regulations promulgated thereto; or where a change has occurred in the availability of demonstrated technology or practices for the control or abatement of pollutants applicable to the point source;

- i. Discharges associated with coal mining or non-coal mining activities pursuant to the Department's regulations at 25 Pa. Code Chapters 86 and 77.
  - j. Discharges associated with a construction activity that may adversely affect a Pennsylvania or federal endangered or threatened species or its habitat.
3. The Department, and the local county conservation district when acting as the reviewing entity, may require by written notice any person authorized by this permit to apply for an Individual NPDES permit. This notice shall include the following: (1) a brief statement of the reasons for the decision, (2) an application form for an Individual NPDES permit, and (3) a statement setting a 90 day deadline for the owner or operator to file the application.
  4. Persons requesting a renewal of coverage under this general permit must submit to the reviewing entity an administratively complete and acceptable NOI, at least 90 days prior to the expiration date of the coverage, unless permission has been granted by the reviewing entity for submission at a later date. In the event that a timely, administratively complete, and acceptable application for renewal of coverage has been submitted and the Department is unable, through no fault of the permittee, to reissue the approval for coverage before the expiration date of the approved coverage, the terms and conditions of the approved coverage will be automatically continued and will remain fully effective and enforceable pending the issuance or denial of the renewal of coverage, provided the permittee is, and has been, operating in compliance with the terms and conditions of the permit.
  5. No condition of this permit shall release any person from any responsibility or requirements under other federal or Pennsylvania environmental statutes or regulations or local ordinances.

The NPDES General Permit for Discharges of Stormwater Associated with Construction Activities (1997 Amendment) PAG-2 is issued October 10, 1997, and shall expire at midnight October 9, 2002 unless reissued on or before this date by the Department.

BY   
GLENN MAURER  
DIRECTOR  
BUREAU OF WATER QUALITY PROTECTION

**EFFLUENT LIMITATIONS, MONITORING AND REPORTING REQUIREMENTS**

**1. EFFLUENT LIMITATIONS**

**a. Best Management Practices**

This permit establishes effluent limitations in the form of implemented Best Management Practices (BMPs) such as Preparedness, Prevention, and Contingency (PPC) Plans, and Erosion and Sediment (E&S) Control Plans which restrict the rates and quantities of sediment and associated pollutants from being discharged into surface waters of the Commonwealth.

**b. Applicable Effluent Limitations**

All stormwater discharges associated with construction activities must comply with applicable effluent limitations established in 25 Pa. Code Chapters 91-97, 101, 102, and 105.

**c. Water Quality Based Effluent Limitations**

Water quality based effluent limitations shall be imposed under applicable state and federal law when necessary to ensure that the water quality standards of the receiving water are attained. Discharges of stormwater associated with a construction activity shall not result in a violation of the water quality standards.

**2. MONITORING AND REPORTING REQUIREMENTS**

**a. Visual Inspections**

The permittee and co-permittee must ensure that visual site inspections are conducted bi-weekly, and after each precipitation event by qualified personnel, trained and experienced in erosion and sediment control, to ascertain that the BMPs are operational and effective in preventing pollution to the waters of the Commonwealth. A written report of each inspection shall be kept, and include:

- (1) a summary of site conditions, BMP's, and compliance; and
- (2) the date, time, and the name of the person conducting the inspection.

**b. Non-compliance Reporting**

Where BMP's are found to be inoperative or ineffective during an inspection, or any other time, the permittee and co-permittee shall immediately contact the reviewing entity, by phone or personal contact, followed by the submission of a written report within 5 days of the initial contact. Non-compliance reports shall include the following information:

- (1) any condition on the project site which may endanger public health, safety, or the environment, or involve incidents which cause or threaten pollution;
- (2) the period of non-compliance, including exact dates and times and/or anticipated time when the activity will return to compliance;
- (3) steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance; and
- (4) the date or schedule of dates, and identifying remedies for correcting non-compliance conditions.

c. **Supplemental Monitoring**

The Department, and the local conservation district when acting as the reviewing entity, reserve the right to require additional monitoring where a danger of water pollution is present, or water pollution is suspected to be occurring from a construction activity subject to this general permit. The permittee or co-permittee shall commence such monitoring upon notification from the Department, or the local county conservation district when acting as the reviewing entity.

3. **RECORD KEEPING**

a. **Retention of Records**

The permittee and co-permittee shall retain records of all monitoring information including copies of all monitoring and inspection reports required by this permit, and records of data used to complete the Notice of Intent for this permit, for a period of three years from the date of the termination of coverage under this permit.

b. **Reporting of Monitoring Reports**

Monitoring results shall be submitted to the reviewing entity upon request.

4. **DISCHARGES CONSISTENT WITH TERMS AND CONDITIONS OF THE PERMIT**

All discharges authorized by this NPDES permit shall be consistent with the terms and conditions of the permit.

PART B  
STANDARD CONDITIONS

1. MANAGEMENT REQUIREMENTS

a. Permit Modification, Termination, or Revocation and Reissuance

- (1) This permit may be modified, suspended, revoked and reissued, or terminated during its term for any of the causes specified in 25 Pa. Code Chapter 92.

The Department may modify, revoke, suspend, or terminate previously issued coverage under this general NPDES permit, and require the stormwater discharger to apply for and obtain an Individual NPDES permit in accordance with 25 Pa. Code Chapter 92.

- (2) The filing of a request by the permittee or co-permittee for a permit or coverage modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated non-compliance, does not stay any permit condition.

- (3) Permit modification or revocation will be conducted according to 25 Pa. Code Chapter 92.

b. Duty to Provide Information

- (1) The permittee or co-permittee shall furnish to the Department, or the local county conservation district when acting as the reviewing entity, within 30 days of the date of request, any information that the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or coverage approved under this permit, or to determine compliance with this permit.

- (2) The permittee or co-permittee shall furnish, upon request, to the Department, or the local county conservation district when acting as the reviewing entity, copies of records required to be kept by this permit.

- (3) When the permittee or co-permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, PPC Plan, E&S Control Plan, or in any other report to the Department, or the local county conservation district when acting as the reviewing entity, the permittee or co-permittee shall promptly submit or correct such facts or information.

- (4) The permittee or co-permittee shall give seven calendar days advance notice to the Department, or the local county conservation district when acting as the reviewing entity, of any planned physical alterations or additions to the permitted facility which could, in any way, substantially affect the quality and/or quantity of stormwater discharged from the activity.

c. Signatory Requirements

Documents required, submitted, or maintained under this permit shall be signed in accordance with the following:

- (1) Notices of Intent, Transferree/Co-permittee Form, and Notices of Termination.

- (a) Corporations: (1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

- (b) Partnerships or sole proprietorships: a general partner or the proprietor, respectively; or

- (c) Municipalities, State, Federal, or other public agencies: either a principal executive officer or ranking elected official; (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
  - (2) All reports, plans, documents, and other information required by the permit or requested by the Department, or the local county conservation district when acting as the reviewing entity, shall be signed by the permittee or co-permittee, or by a duly authorized representative of the permittee or co-permittee.
  - (3) If there is a change in the duly authorized representative of the permittee or co-permittee, respectively, the permittee or co-permittee shall notify the reviewing entity within 30 days of the change.
- d. **Transfer of Ownership or Control**
- (1) This permit is not transferable to any person except after notice to the Department, or local county conservation district when acting as the reviewing entity.
    - (a) In the event of any pending change in control or ownership of facilities from which the authorized discharges emanate, the permittee or co-permittee shall notify the Department, or the local county conservation district when acting as the reviewing entity, using the form entitled "Transferee/Co-permittee Application" of such pending change at least 30 days prior to the change in ownership or control.
    - (b) The Transferee/Co-permittee Application Form shall be accompanied by a written agreement between the existing permittee and the new owner or operator stating that the existing permittee shall be liable for violations of the permit up to and until the date of coverage transfer and that the new owner or operator shall be jointly and individually liable for permit violations under the permit from that date on.
    - (c) After receipt of the required documentation, the Department, or the local county conservation district when acting as the reviewing entity, shall notify the existing permittee and the new owner or controller of its decision concerning approval of the transfer. Such requests shall be deemed approved unless the Department, or the local county conservation district when acting as the reviewing entity, notifies the applicant otherwise within 30 days.
  - (2) The Department or the local county conservation district when acting as the reviewing entity, may require the new owner or operator to apply for and obtain an Individual NPDES permit.
  - (3) For purposes of this permit, operators shall include general contractors. If, prior to construction activities, the owner is the permittee and an operator/general contractor is later identified to become a co-permittee, the owner shall:
    - (a) Notify the Department, or the local county conservation district when acting as the reviewing entity, by submitting an administratively complete and acceptable Transferee/Co-permittee Application Form.
    - (b) After receipt of the documentation described in (a) above, the permit will be considered modified by the Department. For purposes of this permit, this modification is considered to be a minor permit modification.
    - (c) Monitoring reports and any other information requested under this permit shall reflect all changes to the permittee and the co-permittee name.

e. **Removed Substances**

Solids, sediments and other pollutants removed in the course of treatment or control of stormwater shall be disposed in accordance with federal and state law and regulations in order to prevent any pollutant in such materials from adversely affecting the environment.

f. **Facilities Construction, Operation, and Maintenance**

The permittee and co-permittee shall design, build, implement, and at all times operate and maintain BMP's, including PPC Plans, E&S Control Plans, and any other stormwater pollution prevention and management measures.

g. **Adverse Impact**

The permittee and co-permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

h. **Reduction, Loss, or Failure of the BMPs**

Upon reduction, loss or failure of the BMPs, the permittee and co-permittee shall take immediate action to restore the BMPs or provide an alternative method of treatment.

i. **Termination of Coverage**

**Notice of Termination.** Where all stormwater discharges associated with construction activity that are authorized by this permit are eliminated, the permittee or co-permittee of the facility must submit a Notice of Termination (NOT) form that is signed in accordance with Part B.1.c. (Signatory Requirements) of this permit. All letters certifying discharge termination are to be sent to the Department, or the local county conservation district, when acting as the reviewing entity.

2. **COMPLIANCE RESPONSIBILITIES**

a. **Duty to Comply**

The permittee and co-permittee must comply with all terms and conditions of this general permit. Any permit non-compliance constitutes a violation of the Pennsylvania Clean Streams Law and the federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit or permit renewal.

b. **Penalties for Violations of Permit Conditions**

The permittee and co-permittee may be subject to criminal and/or civil penalties for violations of the terms and conditions of this general permit under Section 602 and 605 of the Clean Streams Law, 35 P.S. Sections 691.602 and 691.605, and under the Clean Water Act as specified in 40 C.F.R. Sections 122.41(a)(2) and (3), which are incorporated by reference.

c. **Need to Halt or Reduce Activity Not a Defense**

The permittee or co-permittee may not use as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.

d. **Penalties and Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee or co-permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA (33 U.S.C. §1321) or Section 106 of CERCLA.

e. **Property Rights**

This permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

f. **Severability**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

g. **Other Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee or co-permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Clean Water Act.

h. **Right of Entry**

Pursuant to Sections 5(b) and 305 of the Pennsylvania Clean Streams Law (35 P.S. §§691.5(b) and 691.305) and 25 Pa. Code Chapter 92, and §1917-A of the Administrative Code, the permittee and co-permittee shall allow the head of the Department, the EPA Regional Administrator, and/or an authorized representative of EPA, DEP, county conservation district or, in the case of a facility which discharges to a municipal separate storm sewer, an authorized representative of the municipal operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents, as may be required by law, to:

- (1) Enter upon the permittee's or co-permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
- (2) Have access to and copy at reasonable times, any records that must be kept under the terms and conditions of this permit;
- (3) Inspect any facilities or equipment (including monitoring and control equipment); and
- (4) Observe or sample any discharge of stormwater.

i. **Availability of Reports.**

Except for data determined to be confidential under Section 607 of the Clean Streams Law, (35 P.S. §691.607) all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department or the local county conservation district, when acting as the reviewing entity. As required by the Clean Water Act, the Clean Streams Laws, and 25 Pa. Code, Chapter 92 of the Department's regulations, permit applications, permits, and other documents related to this permit shall not be considered confidential.

j. Penalties for Falsification of Reports

Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than 2 years, or by both. In addition, criminal sanctions are set forth for false swearing and unsworn falsification at 18 Pa. C.S. §§4903-4904.

3. **DEFINITIONS**

Best Management Practices (BMPs) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce pollution to the waters of the Commonwealth. BMPs include PPC Plans, Erosion and Sediment Control Plans, Storm Water Management Act Plans, and other treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, and other drainage from the construction activity.

Co-Permittee – A discharger of stormwater associated with construction activity who is jointly and individually responsible for compliance with all conditions of a permit and applicable laws with another entity for discharges to surface waters of the Commonwealth from their construction activity. Each co-permittee shall only be responsible for stormwater discharges from activities owned and/or operated by such co-permittee.

Department – The Department of Environmental Protection (“DEP”) of the Commonwealth.

Director – The Director of the Bureau of Water Quality Protection, or any authorized employee thereof.

Municipality – Any county, city, borough, town, township, school district, institution or any authority created by one or more of the foregoing.

NOI – “The Notice of Intent for Coverage under the Pennsylvania General Permit for Discharges of Stormwater Associated with Construction Activities (PAG-2).”

Owner - A person who holds legal title to the land subject to construction activity. This term also includes the person(s) who held legal title to the land subject to construction activity at the time such activity was commenced on a site.

Person – Any natural person, partnership, association, corporation, business organization, or any agency, instrumentality or entity of Federal or State Government. Whenever used in any clause prescribing and imposing a penalty, or imposing a fine or imprisonment or both, the term “person” shall not exclude the members of an association and the directors, officers, or agents of a corporation.

Reviewing entity – For the purposes of this general permit, shall generally mean the local county conservation district. Persons seeking coverage under the general permit must contact the local county conservation district in the county for which coverage is sought to ascertain if the district is participating as the entity reviewing NOI's submitted pursuant to the general permit. The Department is the reviewing entity in a given county if the local county conservation district chooses not to participate in the review of NOI's submitted pursuant to this general permit.

Runoff Coefficient – The fraction of total rainfall that will appear at the conveyance as runoff.

Stabilization – The proper placing, grading and/or covering of soil, rock or earth to insure its resistance to erosion, sliding or other movement. The standard for vegetative cover to be a uniform coverage or density is 70% across the entire disturbed area.

Stormwater – Stormwater runoff, snow melt runoff, and surface runoff and drainage.

**Stormwater Associated with Construction Activity** – The discharge into surface waters of the Commonwealth, municipal separate storm sewers, or non-municipal separate storm sewers from any conveyance which is used for collecting and conveying stormwater and which is related to construction activities. Construction activities include clearing, grading, and excavation activities except operations that result in the disturbance of less than five acres of total land area which are not part of a larger common plan of development or sale. The term does not include non-point source stormwater discharges from silvicultural activities.

**Surface Waters of the Commonwealth** – Any and all rivers, streams, creeks, rivulets, impoundments, ditches, water courses, storm sewers, lakes, dammed water, ponds, springs, wetlands and all other bodies or channels of conveyance of surface water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

**Wetlands** – Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs and similar areas.

## PART C

### OTHER CONDITIONS

#### 1. PROHIBITION OF NON-STORMWATER DISCHARGES

All discharges covered by this permit shall be composed entirely of stormwater. Discharges of material other than stormwater must be in compliance with an NPDES permit (other than this permit) issued for the discharge. Discharge of sewage or industrial waste (other than sediment under this permit) to an erosion control best management practice is not permitted.

#### 2. EROSION AND SEDIMENT CONTROL PLANS

- a. An Erosion and Sediment Control Plan, must be prepared, developed, and implemented for each activity covered by this permit in accordance with the Department's Chapter 102 Rules and Regulations, and Department guidance. Each plan must be submitted to the Department or local county conservation district when acting as the reviewing entity. E&S Control Plans, BMPs, and revisions thereto, which meet the requirements of Chapter 102, are conditions of this permit and incorporated by reference.
- b. Erosion and Sediment Control Plans required under this permit are considered reports that shall be available to the public under Section 607 of the Clean Streams Law, and 25 Pa. Code, Chapter 92 of the Department's regulations. The owner or operator of a facility with stormwater discharges covered by this permit shall make plans available to the public upon request by the public. Erosion and Sediment Control Plans must be made available at the site of the construction activity at all times.
- c. The staging of earth disturbance activities and maintenance requirements contained in the E&S Plan must be followed.

#### 3. RECYCLING AND DISPOSAL OF BUILDING MATERIALS AND WASTES

All building materials and wastes must be removed from the site and recycled or disposed in accordance with the Department's Solid Waste Management Regulations at 25 Pa. Code §260.1 et seq., §271.1 et seq., and §287.1 et seq. No building material or wastes or unused building materials shall be buried, dumped, or discharged at the site.

#### 4. APPROVED STATE OR LOCAL PLANS

The BMP's shall be consistent with procedures and requirements specified in Department approved watershed storm watermanagement plans, prepared by counties pursuant to the Pennsylvania Storm Water Management Act (No. 167, P.L. 864; October 4, 1978) and local storm water management ordinances enacted under Act 167. Applicable BMPs, procedures and requirements specified in watershed storm water management plans approved by state or local officials are, upon authorization to discharge under this general permit, incorporated by reference.

#### 5. PREPAREDNESS, PREVENTION AND CONTINGENCY PLANS

If the potential exists for causing accidental pollution of air, land, or water, or for causing endangerment of public health and safety through accidental release of toxic, hazardous, or other polluting materials, the permittee or co-permittee must develop a Preparedness, Prevention, and Contingency (PPC) Plan. The PPC Plan shall be developed in accordance with Department regulations. The PPC Plan shall identify areas which may include, but are not limited to, waste management areas, raw material storage areas, temporary and permanent spoils storage areas, maintenance areas, and any other areas that may have the potential to cause non-compliance with the terms and conditions of this permit due to the storage, handling, or disposal of any toxic or hazardous substances such as oil, gasoline, pesticides, herbicides, solvents, etc. BMP's shall be developed and implemented for each identified area. The PPC Plan shall be maintained on site at all times and shall be made available for review at the Department's or county conservation districts' request.

**6. PRE-CONSTRUCTION CONFERENCES**

The permittee or co-permittee shall contact the reviewing entity at least seven days before construction is to begin to determine if a pre-construction conference is required. The permittee, co-permittee and others undertaking the earth disturbance activity must attend a pre-construction conference if requested by the reviewing entity.

**7. SPOIL OR BORROW AREA**

The Erosion and Sediment Control Plan, shall be prepared, developed and implemented for all spoil and borrow areas, regardless of their location.

**8. PHASED PROJECTS**

Prior to the commencement of earth disturbance activities for additional phases or portions of the project, the permittee or co-permittee shall submit an Erosion and Sediment Control Plan for each additional phase or portion of the project for review and authorization by the reviewing entity.

Coverage under this permit is only granted for those phases or portions of a project for which an Erosion and Sediment Control Plan has been submitted to and authorized by the reviewing entity.

**9. CLARIFICATION ASSISTANCE**

The permittee or co-permittee shall contact the processing entity for clarification of any requirements contained in the Erosion and Sediment Control Plan or other documents related to this permit.

**10. WETLAND PROTECTION**

If hydric soils are present, a wetland determination must be conducted in accordance with Department procedures. All wetlands identified must be included on the E&S Control Plan.



COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF WATERSHED MANAGEMENT

OFFICIAL USE ONLY  
 PA \_\_\_\_\_

**TRANSFeree/CO-PERMITTEE APPLICATION FOR A GENERAL OR  
 INDIVIDUAL NPDES PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH  
 CONSTRUCTION ACTIVITIES**

TYPE OR PRINT IN BLOCK LETTERS

A. PERMIT INFORMATION					
<input type="checkbox"/> Check here if applying for permit transfer.		<input type="checkbox"/> Check here if applying to be added as a co-permittee.			
GENERAL OR INDIVIDUAL NPDES PERMIT FOR DISCHARGES OF STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES FOR WHICH APPLYING AS TRANSFEREE/CO-PERMITTEE.					
PERMIT NO.: _____		DATE ISSUED: _____			
B. CURRENT PERMITTEE INFORMATION					
DEP Client ID# (if known)			Applicant Type / Code (if known)		
Organization Name or Registered Fictitious Name			Employer ID# (EIN)	Contact Person	
Individual Last Name	First Name	MI	Suffix	SSN	
Additional Individual Last Name	First Name	MI	Suffix	SSN	
Mailing Address Street					
City	State	ZIP+4	County	Phone	
C. SITE INFORMATION					
DEP Site ID# (if known)		Site Name			
DEVELOPMENT NAME (IF APPLICABLE):					
SITE ADDRESS/LOCATION:					
COUNTY: _____		MUNICIPALITY: _____			
DATE OF TRANSFER OF PERMIT RESPONSIBILITY, COVERAGE AND LIABILITY: _____, 20____					
TRANSFER AGREEMENT: Attach a written agreement signed by all parties involved in the change of ownership and/or operational control which provides a specific date (not less than 30 days after the date this application is submitted) for the transfer of permit responsibility, coverage, and liability between the current and new owners/permittees.					

D. TRANSFEREE/CO-PERMITTEE INFORMATION				
DEP Client ID# (if known)		Applicant Type / Code (if known)		
Organization Name or Registered Fictitious Name		Employer ID# (EIN)	Contact Person	
Individual Last Name	First Name	MI	Suffix	SSN
Additional Individual Last Name	First Name	MI	Suffix	SSN
Mailing Address Street				
City	State	ZIP+4	County	Phone

E. COMPLIANCE REVIEW		
Yes <input type="checkbox"/>	No <input type="checkbox"/>	Does the applicant (owner and/or operator) have or require other environmental permits issued by the Department for this project? If yes, list each permit and the compliance history of the permitted facility or operation.
Permit Program: _____		
Permit Number: _____		
Brief Description: _____		
Compliance History: _____		
<p>If the applicant is not in compliance with any environmental law or regulation, or Department permit, order or schedule of compliance, or has failed and continues to fail to comply, or has shown a lack of ability or intent to comply with environmental laws or regulations or any Department permit, order, or schedule of compliance, as indicated by past or continuing violations, provide a narrative description of how the applicant will achieve compliance including the appropriate milestones.</p>		

**Applicant Certification**

I certify under penalty of law that this application and all related attachments were prepared by me or under my direction or supervision by qualified personnel to properly gather and evaluate the information submitted. Based on my own knowledge and on inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. The responsible official's signature also verifies that the activity is eligible to participate in the General or Individual NPDES Permit, and BMP's and other controls are or will be implemented to ensure that water quality standards and effluent limits are attained. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment or both for knowing violations.

\_\_\_\_\_  
Print Name and Title of Person Signing

( ) \_\_\_\_\_  
Telephone Number of Person Signing

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
Date of Application Signed

Notarization:  
Sworn to and Subscribed to Before Me This  
\_\_\_\_\_ Day of \_\_\_\_\_, 20\_\_\_\_

**NOTARY  
SEAL**

Commonwealth of Pennsylvania  
County of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public



COMMONWEALTH OF PENNSYLVANIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF WATERSHED MANAGEMENT

OFFICIAL USE ONLY  
 PA \_\_\_\_\_

**NOTICE OF TERMINATION  
 OF A GENERAL OR INDIVIDUAL NPDES PERMIT  
 FOR STORMWATER DISCHARGES ASSOCIATED WITH  
 CONSTRUCTION ACTIVITIES  
 - OR -  
 FOR AN EROSION AND SEDIMENT CONTROL PERMIT**

1. PERMIT INFORMATION:  
 Check the appropriate boxes.  
 NPDES Stormwater Permit # \_\_\_\_\_  Erosion and Sediment Control Permit # \_\_\_\_\_  
 Check one:  
 I/we am/are no longer the Owner(s) or Operator(s) of the Construction Activity.  
 Earth disturbance activity has ceased and the site is stabilized.

---

2. EARTH DISTURBANCE SITE LOCATION:  
 Facility/Development Name: \_\_\_\_\_  
 Municipality: \_\_\_\_\_ County: \_\_\_\_\_  
 Latitude: \_\_\_\_° / \_\_\_\_' / \_\_\_\_" Longitude: \_\_\_\_° / \_\_\_\_' / \_\_\_\_"  
 U.S.G.S. Quad Map Name: \_\_\_\_\_

---

3. PERMITTEE/CO-PERMITTEE SUBMITTING THIS NOTICE OF TERMINATION:

PERMITTEE	CO-PERMITTEE
Name: _____	Name: _____
Address: _____	Address: _____
City: _____	City: _____
State: _____ Zip Code: _____	State: _____ Zip Code: _____
Telephone Number: _____	Telephone Number: _____

---

4. PERMITTEE INFORMATION AND ACKNOWLEDGEMENT (IF APPLICABLE): (This Section must be completed by the permittee to acknowledge that a co-permittee is submitting this Notice. Leave this section blank if a Co-Permittee is not listed in Section 3.)

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_ Zip Code: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_

I hereby acknowledge that the co-permittee submitting this Notice (identified in Section 3 above) is withdrawing as a permittee.

Name and Official Title of Permittee  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature: \_\_\_\_\_

Date Signed: \_\_\_\_\_, 20\_\_\_\_

5. **CERTIFICATION (To be completed by person(s) listed in Section 3):**

I certify under penalty of law that (1) all discharges associated with earth disturbance activities at the site that are authorized by the NPDES permit or Erosion and Sediment Control Permit identified in Section 1 above have been eliminated, the site has been stabilized and Post Construction Stormwater Management BMPs have been installed or (2) I am no longer an owner or operator of the construction activity. I understand that by submitting this Notice of Termination, I am no longer authorized to conduct earth disturbance activities under the above referenced NPDES permit, or under the Erosion and Sediment Control Permit and that discharging stormwater from construction activities to waters of the Commonwealth is unlawful where the discharge is not authorized by an NPDES permit. I also understand that the submittal of the Notice of Termination does not release a permittee from liability for any violations of this permit or of the federal Clean Water Act, the Pennsylvania Clean Streams Law and the regulations promulgated pursuant thereto or from liability for any environmental damages occurring as a result of any earth disturbance activities conducted at the site. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Official Title of person listed under Section 3:

\_\_\_\_\_  
\_\_\_\_\_

Signature: \_\_\_\_\_

Notarization:

Commonwealth of Pennsylvania

County of \_\_\_\_\_

Sworn to and Subscribed to Before Me This

\_\_\_\_\_ Day of \_\_\_\_\_, 20\_\_\_\_\_

**NOTARY  
SEAL**

My Commission Expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

**Who may file a Notice of Termination (NOT) form:**

Permittees or Co-permittees who are presently covered under an Individual NPDES Permit, the Pennsylvania General NPDES Permit for discharges of stormwater associated with construction activities or an Erosion and Sediment Control Permit may submit an NOT form when: (1) they are no longer the owner or operator of the construction activity at a site which has not been stabilized, or (2) any earth disturbance activity or discharges associated with construction activity at the site have been terminated and the site has been stabilized. For construction activities, elimination of all stormwater discharges occurs when disturbed soils at the construction site have been stabilized and temporary erosion control BMP's have been removed.





**INSTRUCTIONS FOR THE  
TRANSFeree / CO-PERMITTEE APPLICATION FORM FOR A GENERAL OR INDIVIDUAL NPDES PERMIT  
FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES**

**Who may file the Transferee/Co-Permittee Application Form:** This form may be used by an applicant seeking to apply for either complete or partial operational control of earth disturbance activities at a site which are already authorized by either an Individual or General NPDES Permit. Federal NPDES Regulations at 40 C.F.R. §122.21(b) require that Operator(s) must become a permittee. An operator is a person who meets either of the following criteria: 1.) You have operational control of construction project plans and specifications, including the ability to make modifications to those plans and specifications; **OR** 2.) You have day-to-day operational control (supervision) of those activities at the project that are necessary to ensure compliance with the Erosion and Sediment Control Plan for the site or ensure compliance with other permit conditions, i.e., General Contractors. Subcontractors generally do not have supervisory control over earth disturbance activities and therefore usually **should not** become a permittee or co-permittee. If prior to construction activities, there is no operator, the owner must apply for the permit. Once the operator has been selected, the operator must use this application either to be made a co-permittee or to have the permit transferred to the contractor. **Failure of the operator to be added to the permit is a violation of federal and state law and regulation.**

**Where to file the Transferee/Co-Permittee Application Form:** Send this form to the reviewing entity, either to the local county conservation district that is participating as the reviewing entity or, if the Department is the reviewing entity, to the appropriate DEP regional office, Soils and Waterways Section.

**When to file the Application:** This application must be filed at least 30 days prior to the proposed change of ownership and/or operational control which will result in the transfer of permit responsibility, coverage and liability.

**Completing the Application: TYPE OR PRINT IN BLOCK LETTERS IN THE APPROPRIATE SPACES**

- Section A. Permit Information** – Check the appropriate box and enter the Permit Number and date of issuance of the existing Individual or General NPDES Permit assigned to the construction activity at the site identified in Section C below.
- Section B. Current Permittee Information** - Enter the full name, address and telephone number of the individual or organization and contact person that is the current permittee. The Regional Office can supply the Client ID # and Applicant Code, if known.
- Section C. Site Information** - Enter the DEP Site ID#, site name, site address/location, county and municipality of the site where the construction activity authorized by the NPDES Permit is located. Include the date on which the transfer of Permit responsibility, coverage and liability will occur. The Regional Office can supply the Site ID #.
- Section D. Transferee/Co-Permittee Information** - Enter the full name, address and telephone number of the individual or organization and contact person that is applying to assume operational control of construction activities at the site. The Regional Office can supply the Client ID # and Applicant Code, if known.
- Section E. Compliance Review** - The individual or organization referenced in Section D must indicate if any other environmental permits have been received or are pending from DEP as well as their past compliance history and if they are currently in compliance with environmental laws, rules and regulations, permits, orders and schedules of compliance.
- Section F. Certification and Signature of Applicant** - The new Transferee/Co-Permittee Applicant (named in Section D) must complete the required certification that the information contained in this application is true, accurate, and complete; the BMPs are or will be designed and fully implemented in accordance with the NPDES Permit requirements and will meet the applicable standards and limitations of the permit; and further that the applicant has read, understands and agrees to abide by the terms and conditions of the permit. The application shall be signed as follows:
- a. **For a corporation** – By a responsible corporate officer, which means: (1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (2) The manager of one or more manufacturing, production or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
  - b. **For a partnership or sole proprietorship** – By a general partner or the proprietor, respectively; or
  - c. **For a municipality, State, Federal or other public agency** – by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes: (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

**The application shall be notarized in the space provided.**



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL RESOURCES

90 East Union Street - 2nd Floor  
Wilkes-Barre, PA 18701-3296  
March 20, 1995

(717) 826-2553

Northeast Regional Office

The Department of Army  
Baltimore District  
U.S. Army Corps of Engineers  
P.O. Box 1715  
Baltimore, MD 21203-1715

Attention: Dr. James F. Johnson, Chief  
Planning Division

RE: 401 Certification Request  
Wyoming Valley Levee Raising Project  
Luzerne County

Dear Dr. Johnson:

This will acknowledge receipt of your request for certification for the above-referenced project under Section 401 of the Federal Clean Water Act.

Enclosed is a copy of the "Notice of Final Action on Request for Certification Under Section 401 of the Federal Water Pollution Control Act of 1977" which will be published in the Pennsylvania Bulletin in the near future.

You are hereby notified that water quality certification is granted for this project. Please note that this certification does not extend to the inflatable dam proposal, which has not yet been presented to the Department for consideration.

If you should have any questions regarding this letter, please do not hesitate to contact me at the above number.

Sincerely,



Kate Crowley  
Program Manager  
Water Management Program

Enclosure

(ATTACHMENT)

Recycled Paper



Notice of Final Action on Request for Certification under  
Section 401 of the Federal Water Pollution Control Act of  
1977

Except as otherwise noted below, the Department of Environmental Resources, under Section 401(a) of the Federal Clean Water Act (33 U.S.C.A. Section 1341(a)), certifies that the construction and operation herein described will comply with all applicable provisions of sections 301-303, 306 and 307 of that Act, and that the construction will not violate applicable Federal and State water quality standards.

Any person aggrieved by this action may appeal, under section 4 of the Environmental Hearing Board Act (35 P.S. Section 7514) and 2 Pa.C.S. Sections 501-508 and 701-704 (relating to the Administrative Agency Law), to the Environmental Hearing Board, Second Floor, Market Street State Office Building, 400 Market Street, P.O. Box 8457, Harrisburg, PA 17105-8457, (717) 787-3483. TDD users may contact the Board through the Pennsylvania Relay Service, (800) 654-5984. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the Board's rules of practice and procedure may be obtained from the Board. The appeal form and the Board's rules of practice and procedure are also available in braille or on audiotape from the Secretary to the Board at (717) 787-3483. This paragraph does not, in and of itself, create any right of appeal beyond that permitted by applicable statutes and decisional law.

Northeast Field Office, Water Management Program, 90 East Union Street - 2nd Floor, Wilkes-Barre, PA. 18701-3296

Certification Request Initiated by:

Department of the Army  
US Army Corps of Engineers  
PO Box 1715  
Baltimore MD 21203-1715

Attention: Dr. James F. Johnson  
Chief, Planning Division

Date of Initial Pennsylvania Bulletin Notice: February 18,  
1995.

**Project Description/Location:**

The project consists of increasing the level of flood protection provided by Federal flood-protection projects located in the communities of Kingston-Edwardsville, Plymouth, Swoyersville-Forty Fort, Exeter, and Wilkes-Barre/Hanover Township. The Water Quality Certification is being requested for the following specific activities: construction of a dug toe stabilization berm, construction of a boat launch ramp, infill of a wetland as a result of a levee berm construction, construction of a streambank stabilization berm, and demolition of 3 bridges and riverine-emplacment of subsequent rock fill to enhance aquatic habitat complexity.

**Final Action on Request: Certification granted.**





**SUPPLEMENTAL  
HIGHWAY OCCUPANCY PERMIT**

**ORIGINAL PERMIT NO. 04024395  
SUPPLEMENTAL PERMIT NO. 04024395 -2**

THE ORIGINAL PERMIT, BEARING NUMBER SHOWN ON THIS SUPPLEMENT, WAS ISSUED TO:

**PERMITTEE:** LUZERNE COUNTY FLOOD PROTECTION AUTH  
**ADDRESS:** 200 NORTH RIVER STREET  
**CITY/STATE/ZIP:** WILKES-BARRE PA 18711

THE ORIGINAL PERMIT IS HEREBY AMENDED OR REVISED BY THIS SUPPLEMENTAL PERMIT AS FOLLOWS:

- ♦ EXTEND TIME OF ORIGINAL PERMIT FROM 03-10-01 TO 03-10-02 .

**COMMONWEALTH OF PENNSYLVANIA**

UNDER AND SUBJECT TO ALL THE MINIMUM CONDITIONS, RESTRICTIONS AND REGULATIONS PRESCRIBED BY THE PA DEPARTMENT OF TRANSPORTATION (SEE IN PARTICULAR 67 PA CODE, CHAPTERS 441 AND 459) AND ON THE ORIGINAL PERMIT, FORM M-945P. THIS SUPPLEMENT IS NOT VALID UNTIL SIGNED BY THE DISTRICT PERMIT MANAGER.

For Secretary of Transportation

By District Engineer

**ORGANIZATION.:** 043  
**ISSUE DATE:** 04-11-01  
**SUPPLEMENT FEES:** N/A  
**ACCOUNT NUMBER:** N/A

DISTRICT PERMIT MANAGER

THIS SUPPLEMENTAL PERMIT IS VALID ONLY WHEN IT IS ATTACHED TO THE ORIGINAL PERMIT.

PERMITTEE  DISTRICT  COUNTY {OPTIONAL:  RECORDING  BILL  INSPECTOR}

# APPLICATION FOR HIGHWAY OCCUPANCY PERMIT 951334



## INSTRUCTIONS ON REVERSE

ENGINEERING DISTRICT \_\_\_\_\_

Applicant - Owner LUZERNE COUNTY FLOOD PROTECTION AUTHORITY	
Address 200 NORTH RIVER STREET	
Post Office WILKES BARRE PA	Zip Code 18711
Phone 570 825 1600	

Application	Inspection		Inspe.
	1	2	
441/459 Ref. No.			
Unit Fee			
Number of Units	1		
Item Fee			
Permit Fee \$ <u>N/A</u>			
Account No. _____			
Check or Money Order No. _____			

County LUZERNE

Township/Boro \_\_\_\_\_

Date work is scheduled to begin \_\_\_\_\_

Approximate date when work will be completed \_\_\_\_\_

If utility: Opening over 36 ft<sup>2</sup> along and/or across highway \_\_\_\_\_ FT. \_\_\_\_\_ FT. \_\_\_\_\_ FT.  
(IN PAVEMENT) (IN SHOULDER) (OUTSIDE SHOULDER)

If utility:  Installation  Emergency Repair - E.P.C. No. \_\_\_\_\_ Entry No. \_\_\_\_\_  Repair  Replace  Service Connection or Disconnection  Removal

If driveway: Anticipated average daily traffic \_\_\_\_\_ ADT cars \_\_\_\_\_ ADT trucks \_\_\_\_\_ ADT buses \_\_\_\_\_ TOTAL ADT \_\_\_\_\_

One Call Serial No. \_\_\_\_\_

### -STATE ROUTE LOCATION

### DESCRIPTION OF PROPOSED WORK

S.R.	Extend permit # 04024395 for 12 months	DEPARTMENT ONLY
Segment		
Offset(s)		
S.R.		
Segment		
Offset(s)		
S.R.		
Segment		
Offset(s)		

Name of Applicant's Consultant(s) \_\_\_\_\_ By: \_\_\_\_\_ (SIGNATURE) Phone: \_\_\_\_\_

Name of Permittee's Contractor(s) must be furnished to the District Office prior to start of work.

Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation (see in particular 67 PA Code, Chapters 203, 441 and 459) and on the issued Permit, Form M-945P, and attachments thereto. The applicant certifies that this application, information and documentation therein or required by the Department is accurate, pursuant to 18 PA C.S. §4904 relating to false swearing to authorities, and that it has or will have all insurance, bonds, and other security required by the Department prior to performing any work authorized by the permit.

The Applicant is (an individual) (a partnership) (a corporation incorporated under the laws of \_\_\_\_\_)

Signed on 9 MARCH 2001 (DATE) LUZERNE COUNTY FLOOD PROTECTION AUTHORITY (NAME OF APPLICANT)

Witness or Attest Adrian Merelli (TITLE) By Thomas P. Picone (TITLE)

Plans are Satisfactory?  YES  NO (Returned on \_\_\_\_\_)

Traffic Control Plan consistent with Chapter No. 203  YES  NO (Returned on \_\_\_\_\_)

Driveway Classification(s) \_\_\_\_\_ MU \_\_\_\_\_ LV \_\_\_\_\_ HV \_\_\_\_\_

M-930  was  was not used.

Limited Access Highway  is  is not involved.

Continuous Inspection  is  is not planned.

Drainage Problem  is  is not anticipated.

Permit  will  will not be recorded.

If E.P.C.: Expiration Date: \_\_\_\_\_

Field Viewed by W. J. Picone (SIGNATURE) 4/16/01 (DATE)

RECEIVED APR 3 2001

DEPARTMENT ONLY



# HIGHWAY OCCUPANCY PERMIT

PERMIT NO.	04021395
ORGANIZATION	043
DATE ISSUED	031099
PERMIT FEES	
ACCOUNT NO.	
COUNTY	40
TOWNSHIP/BORO	304
DESCRIPTION	991
STATE ROUTE NO.	1009
SEGMENTS	0020 0020
OFFSET TO OFFSET	0100 0135
DESCRIPTION	121
STATE ROUTE NO.	1009
SEGMENT(S)	0020 0020
OFFSET TO OFFSET	0160 0250
DESCRIPTION	521
STATE ROUTE NO.	1011
SEGMENT(S)	0031 0031
OFFSET TO OFFSET	0250 0250
TOWNSHIP/BORO	
DESCRIPTION	
STATE ROUTE NO.	
SEGMENT(S)	
OFFSET TO OFFSET	

PERMITTEE  
 LUZERNE CNTY FLOOD PROT AUTH  
 ADDRESS  
 200 NORTH RIVER STREET  
 POST OFFICE  
 WILKES BARRE PA 18711 0000  
 ZIP CODE

COUNTY LUZERNE  
 TOWNSHIP/BORO WILKES BARRE

BOND/AGREEMENT NUMBER  
 ALL WORK UNDER THIS PERMIT MAY BE STARTED ON 03/10/99  
 AND SHALL BE COMPLETED ON OR BEFORE 03/10/00

Immediately upon completion of the work, Permittee shall notify the permit office where application was made. Subject to all the conditions, restrictions, and regulations prescribed by the Pennsylvania Department of Transportation, (see in particular 67 Pa. Code, Chapter 203, 441 and 458) and subject to the plans, special conditions, or restrictions herein set forth or attached hereto. This permit shall be located at the work site and shall be available for inspection by any police officer or department representative.

**DESCRIPTION OF WORK**  
 INSTALL NON-UTILITY CROSSING AT SR 1009 SEG 0020 OFFSET 0100 TO SEG 0020 OFFSET 0135  
 PERFORM EMBANKMENT ALTERATION AT SR 1009 SEG 0020 OFFSET 0160 TO SEG 0020 OFFSET 0250  
 INSTALL LOW VOLUME DRIVEWAY AT SR 1011 SEG 0031 OFFSET 0350 TO SEG 0031 OFFSET 0350  
 THIS PERMIT AUTHORIZES WORK ONLY IN DEPARTMENT HIGHWAY RIGHT OF WAY.  
 CURB MUST BE INSTALLED IN ACCORDANCE WITH PENNDOT ROADWAY STANDARDS R.C. 64 AND R.C. 67.  
 CONTACT DISTRICT PERMIT OFFICE AT LEAST 3 WORK DAYS PRIOR TO START OF WORK AT 570 963-4055.  
 AN INSPECTOR, WHEN AVAILABLE, WILL BE ASSIGNED ON MORE THAN A SPOT INSPECTION BASIS. PERMITTEE WILL BE CHARGED ALL INSPECTION COSTS INCURRED BY THE DEPARTMENT.  
 ACCESS SIGNING AND PAVEMENT MARKINGS MUST BE MAINTAINED BY PERMITTEE.  
 SIDEWALK CONSTRUCTION OR REPLACEMENT SHALL PROVIDE ACCOMMODATIONS FOR PERSONS WITH DISABILITIES IN ACCORDANCE WITH PENNDOT STANDARDS.  
 DEPARTMENT MUST BE NOTIFIED UPON COMPLETION OF WORK  
 X  
 X  
 X

THIS PERMIT IS NOT VALID UNTIL SIGNED BY THE DISTRICT ENGINEER OR HIS AUTHORIZED REPRESENTATIVE

**Acknowledgement of Completion**  
 Permitted work has been completed.  
 Date \_\_\_\_\_ By \_\_\_\_\_

*Bradley L. Mallory*  
 FOR BRADLEY L. MALLORY  
 Secretary of Transportation  
 BY CHARLES N. MATTEI, P.E.  
 District Engineer

FILE: 01000

INSTRUCTIONS ON REVERSE

ENGINEERING DISTRICT 4-0

Applicant - Owner

**LUZERNE COUNTY FLOOD PROTECTION AUTHORITY**  
 Address  
 200 NORTH RIVER STREET  
 Post Office  
 WILKES-BARRE PA 18711  
 Zip Code  
 Phone  
 (717) 825-1600

441/459 Ref. No.

Unit Fee

Number of Units

Item Fee

Application	Inspection 1	Inspection 2	Inspection 3
<input checked="" type="checkbox"/>			
1			

Permit Fee \$ 1/F  
 Account No. \_\_\_\_\_  
 Check or Money Order No. \_\_\_\_\_

County LUZERNE

Township/Boro CITY OF WILKES BARRE 304

Date work is scheduled to begin 3/99

Approximate date when work will be completed 4/01

If utility: Opening over 36 ft<sup>2</sup> along and/or across highway \_\_\_\_\_ FT. \_\_\_\_\_ FT. \_\_\_\_\_ FT.

If utility:  Installation  Emergency Repair - E.P.C. No. \_\_\_\_\_ Entry No. \_\_\_\_\_  Repair  Replace  Service Connection of Disconnection  Remove

If driveway: Anticipated average daily traffic \_\_\_\_\_ cars \_\_\_\_\_ trucks \_\_\_\_\_ buses \_\_\_\_\_ tractor-trailers

STATE ROUTE LOCATION

DESCRIPTION OF PROPOSED WORK

24395

S.R. 1009	PLACEMENT OF SINGLE FACE BARRIER FOR CONSTRUCTION ACCESS UNDER THE MARKET STREET BRIDGE.	DEPARTMENT USE ONLY 121 521
Segment 20		
Offset(s) 100-135		
S.R. 1009	PLACEMENT OF LEVEE EMBANKMENT MATERIAL WITHIN PENNDOT RIGHT OF WAY.	
Segment 20		
Offset(s) 160-250		
S.R. 1011	PLACEMENT OF CONSTRUCTION ENTRANCE DURING LEVEE RAISING AND REPLACEMENT OF SIDEWALK AND CURBING UPON COMPLETION OF LEVEE RAISING.	
Segment 21		
Offset(s) 350		

Name of Applicant's Consultant(s) BURKAVAGE DESIGN ASSOCIATES BY Phone: 717-586-0710

Name of Permittee's Contractor(s) must be furnished to the District Office prior to start of work. \_\_\_\_\_  
 Under and subject to all the conditions, restrictions and regulations prescribed by the Pennsylvania Department of Transportation (see in particular 67 Pa Code, Chapters 203, 441 and 459) and on the issued Permit, Form M-945P, and attachments thereto. The applicant certifies that this application, information and documentation therein or required by the Department is accurate, pursuant to 18 Pa. C.S. § 4904 relating to false swearing to authorities, and that it has or will have all insurance, bonds, and other security required by the Department prior to performing any work authorized by the permit.

The Applicant is (an individual) (a partnership) (a corporation incorporated under the laws of \_\_\_\_\_)

Signed on \_\_\_\_\_ (Date) \_\_\_\_\_ (Name of Applicant)

Witness or Attest \_\_\_\_\_ By \_\_\_\_\_ Title \_\_\_\_\_

Plans are Satisfactory?  YES  NO (Returned on \_\_\_\_\_)

Traffic Control Plan consistent with Chapter No. 203  YES  NO (Returned on \_\_\_\_\_)

Driveway Classification(s) \_\_\_\_\_ MU \_\_\_\_\_ LV \_\_\_\_\_ MV \_\_\_\_\_ HV

M-930  was  was not used.

Limited Access Highway  is  is not involved.

Continuous Inspection  is  is not planned.

Drainage Problem  is  is not anticipated.

Permit  will  will not be recorded.

If E.P.C.: Expiration Date \_\_\_\_\_

Field Viewed by \_\_\_\_\_ (Signature) \_\_\_\_\_ (Date)

RECEIVED NOV 30 1998

VT USE ONLY  
DEPT

## SECTION 01050

JOB CONDITIONS  
01/01

## PART 1 GENERAL

## 1.1 LAYOUT OF WORK

## 1.1.1 Location of Bench Marks and Control Points

The Government has established bench marks and horizontal control points at the site of the work. Locations and values for these survey control points are indicated on contract drawings. Copies of control point descriptions are attached to the end of this section.

## 1.1.2 Layout Using Control Points

From these control points the Contractor shall lay out the work by establishing all lines and grades at the site necessary to control the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings.

## 1.1.3 Minimum Requirements

The bench marks and control points above are minimum requirements and the Contractor shall place and establish such additional stakes and markers as may be necessary for control and guidance of his construction operations. All survey data shall be recorded in accordance with standard and approved methods. All field notes, sketches, recordings and computations made by the Contractor in establishing above horizontal and vertical control points shall be available at all times during the progress of the work for ready examination by the Contracting Officer or his duly authorized representative.

## 1.1.4 Tools, Labor and Markers

The Contractor shall furnish, at his own expense, all such stakes, spikes, steel pins, templates, platforms, equipment tools and material and all labor as may be required in laying out any part of the work from the control points established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other markers established by him until authorized to remove them. If any of the control points established at the site by the Government are destroyed by or through the negligence of the Contractor prior to their authorized removal, they may be replaced by the Contracting Officer, and the expense of replacement will be deducted from any amount due or which may become due the Contractor. The Contracting Officer may require that work be suspended at any time when horizontal and vertical control points established at the site by the Contractor are not reasonably adequate to permit checking the work. Such suspension will be withdrawn

upon proper replacement of the control points. (ECI 7-672.2)

#### 1.1.5 Closure Structures, Embankment, and Willow Street Layout

The proposed centerline of the sheetpile and walls and the centerline, slope breaks and toe for the embankment shall be staked in the field, at each full and half station, and approved by the Contracting Officer prior to commencing any stripping, excavations, fills, or sheet pile driving.

#### 1.2 PHYSICAL DATA: (APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation or conclusion drawn from the data or information by the Contractor. (CENAB)

##### 1.2.1 Transportation Facilities

WYOMING VALLEY, PA.

Highways: The project is accessible by State Route 11 and U.S. Route 81.

Railroad: A branch line of CONRAIL services the project site.

Airports: The Wilkes-Barre/Scranton Airport serves the area with several airlines providing scheduled service.

##### 1.2.2 Explorations

The physical conditions indicated on the drawings and in the specifications are the result of site investigations by core borings. Foundation exploration logs are shown on drawings. Whenever subsurface exploration logs are presented in the contract documents, soil test results are available for inspection in the Baltimore District, Corps of Engineers, Geotechnical Branch, Room 9250, City Crescent Building, 10 South Howard Street, Baltimore, Maryland. Prospective bidders are required to call (410) 962-2002 between the hours of 9:00 a.m. and 3:30 p.m., Monday through Friday (excluding Federal Holidays), a minimum of 3 days in advance to arrange a time and date for the inspection of the samples.

##### 1.2.3 Soil Sampling for Contaminants

a. The USACE performed a focused site investigation within the construction limits of the levee between station 1+00 and 7+00 to determine if lead and antimony impact any soil. This stretch of the levee alignment was selected for sampling based on a previous investigation that had detected elevated levels of lead in two samples and an elevated level of antimony in one sample.

b. Soil samples collected during the focused site investigation had detected total lead concentrations ranging from 13 mg/kg to 310 mg/kg at depths ranging from 0 to 6 feet at certain locations. Total antimony

results were all non-detect (< 1.1 mg/kg) except for one sample detected at 2 mg/kg.

c. All sample results for total lead and antimony are less than the PADEP Act 2 Medium-Specific Concentrations (MSC) for Direct Contact Non-Residential (as well as Residential) Limits. Also, the total lead and antimony results are less than the PADEP Act 2 MSC for Soil to Groundwater Limits. None of the soil samples exceeded the TCLP limit for lead, therefore soil and fill material to be excavated will not need to be handled as hazardous waste for disposal purposes.

d. There will be no impact to the construction from the lead or antimony levels present in the soil, based on the analytical results of the soil samples collected (between stations 1+00 and 7+00). These soil samples were analyzed for total lead, total antimony, and TCLP lead. The Investigation Report is available for review at the USACE, Baltimore District Office.

e. Various fill materials were encountered at most of the sampling locations. Frequently, the fill material consisted of some combination of ash and coal fragments with gravel, brick, concrete and roadway material. Where borings extended below the depth of fill, grey silts and silty clays were encountered. It is known that along reaches of the Susquehanna River coal refuse combined with various construction type debris was used as random fill. Pennsylvania recognizes that PAH compounds and metals are commonly associated with coal refuse materials.

f. In order to ensure worker safety and health, dust suppression methods should be applied during excavation and movement of soil and fill material to minimize the stirring of small soil and dust particles possibly containing lead. Also, two rounds of air monitoring should be performed to determine any potential lead exposure. Air monitoring should be performed for each major operation: during soil excavation and placement or relocation of soil.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Shut Down Utility Services; G AR.

Prior approval for service/utility interruptions.

Preconstruction Surveys; G AR.

Prior to construction, survey paving and establish control points and revise plan as required and submit for approval.

Construction Sequence Plan; G ED.

Wall Protection and Monitoring Plan; G ED.

Advance Notice

When changes and/or relocations are required.

Checklist; G AR

A Risk Assessment for excavation and other work in the vicinity of utilities.

Maintenance of Traffic

Interruption of railroad traffic.

Control Records

The recording for which all materials and equipment specified to be salvaged and turned over to the Government.

SD-05 Design Data

Traffic Control Plan; G AR

Text and narrative defining management of traffic and street closures during construction.

Field Notes and Records;

Data resulting from quantity surveys.

Quantity Surveys

The furnishing of all original field notes and all other records relating to the survey or to the layout of the work.

SD-06 Test Reports

Base Survey Report; G ED.

Intermediate Monitoring Reports; G ED.

Final Monitoring Report; G ED.

#### 1.4 UTILITIES

##### 1.4.1 Availability of Utilities Including Lavatory Facilities: (JUN 1980)

It shall be the responsibility of the Contractor to provide all utilities he may require during the entire life of the contract. He shall make his own investigation and determinations as to the availability and adequacy of utilities for his use for construction purposes and domestic consumption. He shall install and maintain all necessary supply lines, connections, piping, and meters if required, but only at such locations and in such manner as approved by the Contracting Officer. Before final acceptance of work under this contract, all temporary supply lines, connections and piping installed by the Contractor shall be removed by him in a manner satisfactory to the Contracting Officer. (CENAB)

#### 1.4.1.1 Sanitation Facilities

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer. Toilet facilities in private residences or businesses will not be available to Contractor's personnel. Toilet facilities shall be kept clean as directed by the Contracting Officer, and doors securely locked in the evening when work crews leave the area.

#### 1.4.2 Interruption of Utilities: (1972)

a. No utility services shall be interrupted by the Contractor to make connections, to relocate, or for any purpose without approval of the Contracting Officer.

b. Request for permission to shut down utility services shall be submitted in writing to the Contracting Officer not less than 17 days prior to proposed date of interruption. The request shall give the following information:

c. Nature of Utility (Gas, L.P. or H.P., Water, Etc.)

d. Size of line and location of shutoff.

e. Buildings and services affected.

f. Hours and date of shutoff.

g. Estimated length of time service will be interrupted.

h. Services will not be shut off until receipt of approval of the proposed hours and date from the Contracting Officer.

i. Shutoffs which will cause interruption of local government or private work operations as determined by the Contracting Officer shall be accomplished during regular non-work hours or on non-work days of the local government or private entity without any additional cost to the Government.

j. Unless otherwise approved by the Contracting Officer, operation of valves on water mains will be by local utility company personnel. Where shutoff of water lines interrupts service to fire hydrants or fire sprinkler systems, the Contractor shall arrange his operations and have sufficient material and personnel available to complete the work without

undue delay or to restore service without delay in event of emergency.

k. Flow in gas mains which have been shut off shall not be restored until the local utility company inspector has determined that all items serviced by the gas line have been shut off. (CENAB)

#### 1.4.3 Alterations to Utilities: (AUG 1968)

Where changes and relocations of utility lines are noted to be performed by others, the Contractor shall give the Contracting Officer in writing advance notice at least thirty days' of the time that the change or relocation is required. In the event that, after the expiration of thirty days after the receipt of such notice by the Contracting Officer, such utility lines have not been changed or relocated and delay is occasioned to the completion of the work under this contract, the Contractor will be entitled to a time extension equal to the period of time lost by the Contractor after the expiration of said thirty day period. Any modification to existing or relocated lines required as a result of the Contractor's method of operation shall be made wholly at the Contractor's expense and no additional time will be allowed for delays incurred by such modifications. (CENAB)

#### 1.4.4 Utility Markings

The Contractor shall contact the PA One-Call Service, a minimum of 48 hours prior to any excavation, requesting utility location markings. The Contractor shall not proceed with any excavation until all utilities, including abandoned utilities, have been marked to the satisfaction of the Contracting Officer. Prior to requesting the marking of utilities, the Contractor shall stake out proposed excavations and limits of work with white lines ("White Lining"). It is the Contractor's responsibility to ensure that all permits (excavation or otherwise) are current and up-to-date without expiration. In addition to the above requirements the Contractor shall:

- a) Visually survey and verify that all utility markings are consistent with existing appurtenances such as manholes, valve boxes, poles, pedestals, pad-mounted devices, gas meters, etc. prior to any excavation.
- b) Hand dig test holes to verify the depth and location of all utilities prior to any mechanical excavation within the limits of work. Other non-damaging methods for utility verification, as indicated in (d) below, may be considered subject to approval by the Contracting Officer. Also, verify that any abandoned utilities are not active.
- c) Preserve all utility markings for the duration of the project to the furthest extent possible.
- d) When excavation is performed within 2 feet of any utility line, a non-damaging method of excavation shall be used. The non-damaging method shall be hand digging. Other non-damaging methods, such as, soft digging, vacuum excavation, pneumatic hand tools, may be

considered subject to approval by the Contracting Officer.

- e) Regardless of the type of excavation, the Contractor shall notify the Contracting Officer a minimum of 72 hours prior to any excavation activity. Failure to notify the Contracting Officer can result in the issuance of a "Stop Work" order, which shall not be justification for contract delay or time extension. The Government reserves the right to have personnel present on site during any type of excavation.
- f) The Contractor's Quality Control System Manager shall ensure that all excavation requirements herein are met at the time of the preparatory phase of quality control, and that the excavation procedures are reviewed during the preparatory phase meeting. This preparatory phase of control shall also establish and document contingency plans and actions to be followed in the event that existing utilities are damaged or interrupted. Locations of shut off or isolation devices along with other safety features shall be established and their operation reviewed.
- g) Any work other than excavation in the vicinity of a utility, that could damage or interrupt a utility, such as, exterior or interior work near transformers, power lines, poles, above ground gas lines, gas meters, etc., shall be done with extreme care. The Contractor shall specifically note during the preparatory phase of quality control, the construction techniques to be used to preclude damaging or interrupting any utility. This preparatory phase of control shall also establish and document contingency plans and actions to be followed in the event that existing utilities are damaged or interrupted. Locations of shut off or isolation devices along with other safety features shall be established and their operation reviewed.
- h) The Contractor shall complete a risk assessment, using the attached checklist, at least one week prior to the start of any excavation or other work in the vicinity of a utility. The risk assessment shall be submitted for government approval prior to any excavation or other work in the vicinity of a utility. A risk assessment shall be completed for each definable feature of work encountering utilities and shall include all utilities anticipated to be encountered.

#### 1.5 DISPOSAL OF EXISTING MATERIAL AND EQUIPMENT: (DEC 1975)

All removed, dismantled or demolished material and/or equipment including rubble, scrap and debris not specified or indicated to be Government salvaged, or otherwise will become the property of the Contractor and shall be promptly removed from the site and disposed of by the Contractor at his own expense and responsibility. (CENAB)

#### 1.6 MAINTENANCE OF ACCESS: (DEC 1975)

The Contractor shall not block passage through sidewalks, roads, alleys or other entranceways to the Luzerne County Courthouse parking lot, loading

dock, and handicapped entrance and parking or the pumping stations during performance of work under this contract. (CENAB)

1.7 PROTECTION OF GOVERNMENT AND PRIVATELY OWNED PROPERTY AND PERSONNEL:  
(DEC 1975)

1.7.1 Protection of Equipment

All existing local Government or privately owned equipment or property within the work area shall be protected by the Contractor from damage caused by construction operations. As a minimum, the Contractor shall protect such items from any damage due to dust, vibration, water, heat or other conditions resulting from construction activities. Existing work damaged by construction operations shall be promptly repaired by the Contractor at his own expense.

1.7.2 Protection of Personnel

The Contractor shall protect personnel and onlookers by installing safety rails and/or barricades as applicable to prevent injury from unauthorized entry of personnel into work areas. PennDOT approved warning signs shall be erected as necessary to indicate Construction areas or hazardous zones. Work shall proceed in such manner as to prevent the undue spread of dust and flying particles.

1.7.3 Measures to Prevent Damage/Injury

The Contractor shall take such additional measures as may be directed by the Contracting Officer to prevent damage or injury to property or personnel, including the general public. (CENAB)

1.7.4 Courthouse Stone Wall Bracing and Monitoring

1.7.4.1 General

The Contractor shall perform all his work so that it does not adversely impact the integrity of the existing Courthouse stone wall. The work adjacent to the stone wall consists of excavation, backfilling, installation of steel sheetpiling and H-piles, concrete placement, and various other incidental work. In addition, the Contractor shall cut a 2'-8" wide section through the stone wall stem and footer in order to construct the east abutment. Prior to the start of work for the closure structure, the contractor shall submit a Construction Sequence Plan and Wall Protection and Monitoring Plan for approval.

1.7.4.2 Construction Sequence Plan and Wall Protection and Monitoring Plan

The Construction Sequence Plan shall clearly indicate the order of work for each construction phase and the corresponding work to protect and monitor the stone wall. The Wall Protection and Monitoring Plan shall provide the following information:

- a) A description of the procedures for completing the base (initial) survey and assessment of the existing stone wall (photographs of cracks, and other observed damages or structural distress). The plan shall detail how the wall will be surveyed and the number of survey points, wall sections, and profiles to be provided. All surveys shall be tied to existing survey monumentation.
- b) A description of the methods that will be used to protect the wall during construction activities. The plan shall clearly describe the bracing and support systems that will be utilized to support the wall and provide the necessary protection from impact damage from construction equipment. During excavation and backfilling operations for the East Abutment, Utility Bulkhead, and Post Foundation, the wall bracing system is only required on the west side of the wall. However, during all H-pile and sheet pile driving for the East Abutment, Utility Bulkhead, and Post Foundation, the wall bracing system shall be provided on both sides of the wall. The stone wall bracing system shall extend a minimum of 30 feet on each side of the closure centerline. The bracing system shall provide uniform support along the entire wall face capable of safely resisting a uniform pressure from the entire wall surface equal to 250 pounds per square foot. A ¼" layer of fiberboard shall be placed between the bracing sheeting and the wall surface. The design for the bracing system shall be included in the Wall Protection and Monitoring Plan. The design shall demonstrate by calculation that the required loading condition can be safely resisted without the bracing system deflecting more than ¼". It shall also clearly indicate the design assumptions used in the analysis and shall be sealed by an engineer registered in the State of Pennsylvania.
- c) A description of the monitoring plan that will be used during the various phases of the construction work. Requirements for monitoring the stone wall with respect to vibration and settlement during the installation of the sheetpiling and H-piles are provided in Section 02456, "Steel H-piles," and Section 02457N, "Steel Sheet Piling," of the specifications. The monitoring plan shall include the data specified in Section 02456 and 02457N, but it shall also include the monitoring and surveying procedures that will be used to monitor the stone wall during the excavation and backfilling operations adjacent to the stone wall.
- d) A description of type of data, surveys, and evaluation that will be presented in the Final Monitoring Report. This Final Monitoring Report will be submitted within 14 days following all work in the vicinity of the stone wall.

#### 1.7.4.3 Base Survey Report

Prior to the start of any work, the initial Base Survey Report shall be performed and submitted to the contracting office within 14 days of beginning any work adjacent to the stone wall. In addition, Intermediate Monitoring Reports shall be submitted as specified in Section 02456 and 02457N of the specifications and as indicated in the Wall Protection and

#### Monitoring Plan.

##### 1.7.4.4 Delivery of Equipment and Materials

All materials and equipment shall be delivered to and from the courthouse lawn by the use of a crane. Contractor shall not be permitted to access the Courthouse lawn with vehicles from North Street or River Street.

##### 1.7.4.5 Operation/Movement of Equipment

Operation/movement of equipment on the Courthouse lawn shall be kept a minimum distance of 12 feet from the stone wall. The Contractor will minimize the disturbance to the Courthouse lawn by controlling and limiting the area for operating construction equipment and stockpiling materials on the Courthouse lawn.

##### 1.7.4.6 Order of Work

After the submission and approval of all appropriate submittals as specified in other sections of the specifications, the submission of the above plans, and the completion and submission of the Base Survey Report, the Contractor may start work on the closure structure. However, the necessary wall bracing shall be installed and the fill behind the existing stone wall on the Courthouse lawn shall be excavated prior to any excavation at the toe of the stone wall and prior to the installation of sheetpiling and H-piles.

#### 1.8 CONDITION OF CONTRACTOR'S HEAVY EQUIPMENT

- a) The Contractor is advised, based on Corps of Engineers' experience, that utilization of cranes, leads, hammers, and power units of less than 10 years of age, and with full maintenance records, are more likely to comply with safety and environmental requirements. Cranes older than this often do not have, or have non-functional, anti-two-block devices, boom angle indicators, and load moment indicators. With the large radius lifts anticipated in the vicinity of many structures and improvements, these devices are essential.
- b) Furthermore, the hydraulic oil, grease, and drive seals and hoses on hammers, cranes, and power units wear severely over time. Units which do leak oils or other fluids at the project site shall be repaired and the contaminated material shall be removed in accordance with current Local, State or Federal regulations, which may treat the material as a Hazardous and Toxic waste.
- c) In anticipation of large radius lifts within close proximity of many structures and improvements, as well as, environmental concerns with leakage of oil, hydraulic fluid, grease, etc. in this project, the Contracting Officer or his representative reserves the right to reject any equipment that is not in strict compliance with the requirements of EM 385-1-1, Section 16.

#### 1.9 STREET CLOSINGS: (MAY 1978)

When operations in connection with contract work necessitate the closing of, encroachment onto, or work adjacent to streets, it shall be the Contractor's responsibility to arrange for traffic control in advance with the Contracting Officer and appropriate Local and State officials. The Contractor shall provide all necessary traffic control plans (TCP's), personnel and devices as may be required by the Contracting Officer and the appropriate Local and State laws, codes and regulations to accomplish the work. The Contractor, as a minimum, shall comply with the Pennsylvania Department of Transportation "Work Zone Traffic Control Publication 203" (67 PA Code, Chapter 203) for contract work requiring traffic control. The above requirements for traffic control do not apply to locations for which a permit has been approved and specific traffic control is defined in the permit. For those locations, traffic control shall be in strict accordance with the specific permit requirements. (CENAB)

#### 1.9.1 Traffic Control Plan

The Contractor shall submit to the Contracting Officer for approval a traffic control plan. This plan shall include narrative and drawings showing proposed measures when construction operations affect vehicle flow and full or partial street closures. PennDOT, Luzerne County and the City of Wilkes-Barre must approve the plan before any measures are implemented.

#### 1.10 ORDER OF WORK AND COORDINATION WITH OTHER CONTRACTORS: (FEB 1979)

##### 1.10.1 Other Contractors

Other Contractors are presently working in the same area. After award of this contract a meeting will be held with all contractor representatives and the Contracting Officer to develop a plan of work coordination. In case of disagreement regarding use of an area the decision of the Contracting Officer will control. (CENAB)

##### 1.10.2 General Order of Work

Construction of the embankments and closures shall be in accordance with the Construction Phasing Plan and Notes shown on the drawings. Specifically, the closure structure in Phase I shall be constructed and accepted prior to the removal of Courthouse temporary closure structure. 30 days notice shall be given to the Contracting Officer prior to commencing construction within the parking lot to permit sufficient notice to Courthouse visitors. The Contractor shall phase construction activity to minimize traffic and hauling on the existing and new embankments to avoid rutting, shearing, and damage to the embankment material. The hauling equipment shall be operated at speeds which will not damage structures and homes adjacent to the site.

##### 1.10.3 Non-Interference

The Contractor shall not interfere with material, appliances or workmen of the Government, or of any other Contractor who may be working at the site. As far as practicable, all Contractors shall have equal rights to the use

of all roads and grounds. In case of disagreement regarding such use, the decision of the Contracting Officer shall control.

#### 1.10.4 Construction Phasing

Construction of the embankments and closures shall be in accordance with the Construction Phasing Plan and Notes shown on the drawings.

Construction shall be conducted in accordance with the following sequence:

- a) Contact PA One Call for utility clearance.
- b) Install required erosion and sedimentation controls.
- c) Erect appropriate construction fencing to protect public and workers.
- d) Willow street relief culvert access road (option); concurrent with closures: The Contractor will be notified at the award of contract if it will execute this option. If the Government executes this option, the Contractor shall proceed to start construction within 15 days after the NTP. The Contractor shall immediately submit the rockfill material for Government approval. The contractor shall utilized the existing access road for the PADOT Carey Ave Bridge construction; however, PADOT proposes to remove this access road and reconstruct the levee embankment in July 2003. The Contractor shall have use of this access road until 1 July 2003. If the Contractor is still constructing the Willow St. Access Road after July 2003, the Contractor shall provide a new access route over the levee to the work area. Heavy hauling trucks will not be permitted to traffic, at any time, on the existing levee crest and ramp pavements. After 1 July 2003, the newly constructed Willow Street relief culvert access road may be accessed by using the existing levee ramps for light weight vehicles and construction equipment.
- e) Courthouse closure structure, complete including test installation. Embankment downstream of closure shall not commence until completion of courthouse closure.
- f) Remove Courthouse temporary closure and embankments.
- g) Storm drainage modifications; may be concurrent with closure provided drainage is maintained in existing or temporary pipes, otherwise drainage system must be completed first.  
.
- h) Willow Street Relief Culvert modifications (option); concurrent with or following courthouse closure: The Willow Street relief culvert access road will either be already installed by 1 July 2003 (by others) or the Government will execute the option to have the Contractor construct the access road. The Contractor shall assume that the access road will be available for use in order to access the riverside outlet and flap gates of the Willow Street

Relief Culvert.

- i) Solomon Creek Railroad Closure modifications (option); concurrent with or following courthouse closure.

#### 1.11 SALVAGE MATERIAL AND EQUIPMENT: ( OCT 1993)

The Contractor shall maintain adequate property control records for all materials and equipment specified to be salvaged. The Contractor shall be responsible for the adequate storage and protection of all salvaged materials and equipment and shall replace, at no cost to the Government, all salvage materials and equipment which are broken or damaged during salvage operations as the result of his negligence, or while in his care. (CENAB-EN-DT)

##### DESCRIPTION

Courthouse Wall and Concrete Gutter, granite curbs, post and chain fence and signs

The above listed salvage material shall become the property of the Government. The Contractor shall deliver such salvage material to a location as directed by the Contracting Officer. (CENAB)

#### 1.12 ASBESTOS HANDLING AND REMOVAL (FEB 85)

Through site investigations, friable asbestos has not been found, however if asbestos is encountered, its testing, removal and disposal is covered in "CHANGES" clause of the Contract Clauses. (CENAB)

#### 1.13 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

##### 1.13.1 Procedure for Determination

This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance the contract clause entitled "Default: (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

- a. The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

- b. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

##### 1.13.2 Anticipated Adverse Weather Delays

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY  
 WORK DAYS BASED ON (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
7	6	6	7	7	6	4	5	3	5	4	4

1.13.3 Impact

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day. The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph "Anticipated Adverse Weather Delays", above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled "Default (Fixed Price Construction)".

1.14 WORKING HOURS

Working hours shall be 7:30 AM to 5:00 PM, Monday through Friday. All work outside of these hours must be coordinated with the Contracting Officer with the possible input from the local government. No Sunday work will be permitted.

1.15 LIMITS OF WORK AND CONTRACTOR ACCESS

The limits of work areas as shown on the drawings are necessarily approximate. In case of doubt as to the actual limits of any work area, determination as to the actual limits will be made by the Contracting Officer.

1.15.1 Contractor Access

Contractor access to the work areas shall be restricted to routes shown on the drawings and approved by the Contracting Officer. No heavy material or equipment may be brought to the site until access routes are designated and approved.

## 1.16 DAMAGE TO WORK (1966 MAR OCE)

The responsibility for damage to any part of the permanent work shall be as set forth in the "Permits and Responsibilities" clause of the Contract Clauses. However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood or earthquake which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work an equitable adjustment pursuant to the "Changes" clauses of the Contract Clauses, will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work(including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage. (CENAB)

## 1.17 RECORDING AND PRESERVING ARCHEOLOGICAL FINDS:

## 1.17.1 General

All items having any apparent archeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper archeological team may be notified. (CENAB)

## 1.17.2 Time Extensions for Historical, Archaeological and Curtural Resources Delays

## 1.17.2.1 Procedures

This provision specifies the procedures for determination of time extensions for archeological delay in accordance with the Contract Clause entitled DEFAULT (FIXED PRICE CONSTRUCTION). The contract completion time includes 15 days for archeological delays.

## 1.17.2.2 Delay Evaluations

The above anticipated archeological delay will constitute a base line for archeological delay evaluations. Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract on a monthly basis, actual archeological delay days will be recorded on a work day basis and compared to the archeological delay scheduled above. The term actual archeological days shall include days impacted by actual archeological delay.

## 1.17.2.3 Delay Days Calculations

The number of actual archeological delay days shall be calculated chronologically. All archeological delay days must prevent work for 50 percent or more to the Contractor's work day and delay work critical to the timely completion of the project. Once the number of actual archeological delay days anticipated in the schedule above have been incurred, the Contracting Officer will examine any subsequently occurring archeological delay days to determine whether the Contractor is entitled to a work extension. If necessary, the Contracting Officer will issue a modification in accordance with the Contract Clause entitled DEFAULT (FIXED PRICE CONSTRUCTION).

#### 1.17.2.4 Delay Days in Schedule

The Contractor's schedule must reflect the above anticipated archeological delays.

### 1.18 MAINTENANCE OF EXISTING FLOOD PROTECTION

#### 1.18.1 Maintenance

The Contractor shall maintain the existing level of flood protection at all times or during any operations. "Existing level of flood protection" includes maintaining both the height of existing levees, closures, floodwalls, or sheetpiling; and sufficient side slopes and embankment width to maintain that height of protection. Stripping and required excavation as shown on the drawings shall not be considered as reducing the existing level of flood protection. The Contractor will be required to stockpile, immediately adjacent to the area, the appropriate materials for reconstructing the levee embankment. In the event of high river stages, the Contracting Officer will evaluate the situation and, if necessary, direct the Contractor to reconstruct the embankment to its original grades.

#### 1.18.2 Need for Cofferdam

If the Contractor anticipates the need to breach the levee embankment, excavate adjacent original ground, or otherwise reduce the existing level of flood protection, the Contractor shall design and submit a cofferdam for Government approval. The cofferdam shall provide an equivalent level of protection, shall be installed before the anticipated breach (or other reduction) is executed, and shall be completely removed upon completion of the permanent work, except that portions of sheet pile may be cut off and left in place at the direction of, or with the prior approval of the Contracting Officer.

#### 1.18.3 Emergency Construction of Temporary Closures

During a flood event, the Contracting Officer may direct the Contractor to construct the temporary emergency closures at the Courthouse and Solomon Creek closures. Requirements for these emergency closures are specified on the drawings and in Section 01510 of the specifications.

## 1.19 WORK ADJACENT TO RAILROAD PROPERTY:

## 1.19.1 General

Part of the work to be performed under this contract is located adjacent to the existing right-of-way of the Railroad Company. The Contractor shall so prosecute and conduct his work as not, at any time, to interfere with the safe operation of trains. Arrangements for temporary grade crossings required for construction purposes shall be made with the Railroad Company by the Contractor. Pursuant to a relocation agreement entered into between the Delaware & Hudson Railway Company, Inc. and the Contractor, the Railroad will be required to provide all watchmen and flag men needed to safeguard Railroad operations during the construction of the project. The Contractor shall give timely notice to the Railroad of any construction activity to be performed by the Contractor within the vicinity of the right-of-way that might require the Railroad to provide additional numbers of these personnel to safeguard the movement of trains. The cost of providing Railroad watchmen and flagmen will be borne by the Contractor. If the Contractor requires the services of additional watchmen and flagmen to maintain the Contractor's safety standards, the Contractor shall supply the personnel to provide such services and shall bear all costs therefor. No work shall be done on or over the railroad right-of-way until plans showing the method and procedure of the work have been approved by the Contracting Officer and the Delaware & Hudson Railway Company, Inc.. However, approval of the Contracting Officer and the Railroad Company will not relieve the Contractor of any responsibility for the adequacy or safety of the operations.

## 1.19.2 Maintenance of Traffic:

All work shall be performed without interrupting the railroad traffic. The cooperation of the Railroad Company will consist of providing whistle boards at approaches to work sites and issuing slow orders to the train crews as the Railroad deems necessary. It is anticipated that approximately 5-6 trains per day in each direction Monday through Friday, will use the track past the construction site. Plans for the control of the movement of Contractor's equipment and workmen in the vicinity of the right-of-way shall be submitted to the Railroad for its information and to the Contracting Officer for his approval.

## 1.19.3 Liability Insurance

The Contractor, prior to commencement of the construction contemplated herein, shall procure, furnish and keep in effect, until all work under the contract has been completed and accepted, insurance with policies in form satisfactory to the Delaware & Hudson Railway Company, Inc., with an insurance company or companies authorized to operate in the State of Pennsylvania, as follows:

- a. Contractor's Public Liability and Property Damage: Not less than \$250,000/\$500,000 for Bodily Injury and \$250,000/\$500,000 for Property Damage.

- b. Contractor's Protective Public Liability and Property Damage-If any part of the work is to be performed by a subcontractor, the prime Contractor shall carry in his own behalf insurance of the same limits as set forth in (a).
- c. Railroad Protective Public Liability and Property Damage Liability-Not less than \$250,000/\$500,000 for Bodily Injury and \$250,000/\$500,000 for Property Damage. This policy should name the Railroad Company as "The Insured" and comply with the Standard Uniform Policy for Railroad Protective Liability and Property Damage Liability Insurance developed and in 1958 by the A.A.S.H.O. - A.A.R.

#### 1.19.4 Agreement

The Contractor shall furnish to the Contracting Officer prior to commencement of work, copies of all agreements, permits, approved schedules of operations, and pertinent correspondence relative to his negotiations with the Railroad Company.

#### 1.19.5 Payment

Separate payment will not be made for the costs incurred by the Contractor in fulfilling any requirements of this special provision. (CENAB).

#### 1.20 ENVIRONMENTAL LITIGATION (1974 NOV OCE)

If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a Subcontractor at any tier other than as required by the terms of this contract, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of the Contract Clauses. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

The term "environmental litigation", as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment. (CENAB)

#### 1.21 MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the work performed in this Section 01050, JOB CONDITIONS, specified herein; and all costs in

connection therewith shall be considered a subsidiary obligation of the Contractor, and shall be included in the overall cost of the work.(CENAB)

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE

ATTACHMENT

RISK ASSESSMENT CHECKLIST  
WYOMING VALLEY GPS SURVEY NETWORK DATA

-- End of Section --

RISK ASSESSMENT FOR  
EXCAVATION AND OTHER WORK IN THE VICINITY OF UTILITIES

PROJECT NAME: \_\_\_\_\_

CONTRACT NUMBER: \_\_\_\_\_

PROJECT INSTALLATION AND LOCATION: \_\_\_\_\_

PROPOSED EXCAVATION START DATE: \_\_\_\_\_

1.  ESTABLISH EXCAVATION DETAILS AND DRAWINGS (check when completed)
2.  PROPOSED EXCAVATION AREA MARKED ("white lining") (check when completed)
3.  CONTACT APPROPRIATE ONE-CALL SERVICE FOR PUBLIC UTILITIES:  
MD: Miss Utility 1-800-257-7777      N Y : New York City - Long Island One Call Center 1-800-272-4480  
N. VA: Miss Utility 1-800-552-7777      PA: Pennsylvania One-Call System Incorporated 1-800-242-1776  
VA: Miss Utility of VA 1-800-552-7001      DC: Miss Utility 1-800-257-7777  
ONE-CALL NATIONAL REFERRAL CENTER: 1-888-258-0808
- CONTACT INSTALLATION/OWNERS OF ALL PRIVATELY OWNED UTILITIES (NON ONE-CALL MEMBERS)
4.  DATE UTILITIES MARKED AND METHOD OF MARKING  
ONE-CALL LOCATORS \_\_\_\_\_  
OTHER LOCATORS \_\_\_\_\_
5.  CONTACT APPROPRIATE DPW REPRESENTATIVES AND COMPLY WITH INSTALLATION PERMIT REQUIREMENTS: \_\_\_\_\_
6.  UTILITIES IDENTIFIED ON-SITE:  
 NONE  ELECTRIC  GAS  WATER  TELEPHONE  CATV  SEWER  OTHER \_\_\_\_\_
7.  LEVEL OF RISK: (Based upon personnel safety and consequences of utility outages.)  
 SEVERE: Excavation required within the immediate vicinity (<2-ft) of a MARKED utility.  
 MODERATE: Excav. required outside the immediate vicinity (> 2-ft) of MARKED utility.  
 MINIMAL: Excavation required in an area with NO utilities.
8.  EXISTING FACILITIES/UTILITIES IN VICINITY:  
 NON-CRITICAL  MISSION CRITICAL  HIGH-PROFILE  CEREMONIAL  
 OTHER \_\_\_\_\_  
 CONSEQUENCES IF EXISTING UTILITIES ARE DAMAGED/DISRUPTED \_\_\_\_\_

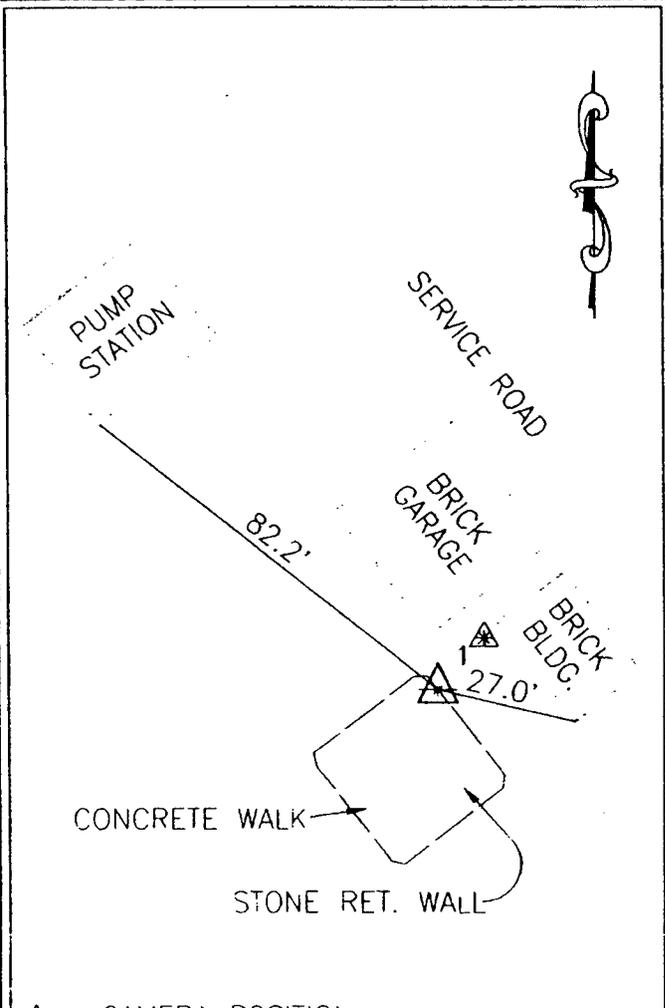
---

9.  ENGINEERING CONTROLS REQUIRED:  
 NONE  HAND EXCAVATE TO LOCATE UTILITY  EXCAVATE WITH DUE CARE  
 OTHER \_\_\_\_\_
10.  ADMINISTRATIVE CONTROLS REQUIRED:  
 Notification of Contracting Officer's Representative, NOTIFIED on: \_\_\_\_\_  
 Notification of Installation/DPW Representative, NOTIFIED on: \_\_\_\_\_
11.  EMERGENCY NOTIFICATION AT INSTALLATION: POC & PHONE NUMBER \_\_\_\_\_

THE INFORMATION NOTED ABOVE IS ACCURATE AND THE WORK IS READY TO PROCEED  
SIGNED and DATE \_\_\_\_\_ CQC MANAGER

12.  ON-SITE GOVERNMENT REP. RECOMMENDATION FOR APPROVAL TO EXCAVATE:  
 YES  NO SIGNATURE AND DATE: \_\_\_\_\_  
Comments: \_\_\_\_\_
13.  AREA ENGINEER APPROVAL TO EXCAVATE:  
 APPROVED  DENIED SIGNATURE AND DATE: \_\_\_\_\_  
Comments: \_\_\_\_\_
14.  CHIEF, \_\_\_\_\_ DIVISION APPROVAL TO EXCAVATE:  
 APPROVED  DENIED SIGNATURE AND DATE: \_\_\_\_\_  
Comments: \_\_\_\_\_

## WYOMING VALLEY GPS SURVEY NETWORK DATA

<b>NAME OF STATION: GA 1</b> <input type="checkbox"/> RECOVERED <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997	<b>LOCATION METHOD</b> <input checked="" type="checkbox"/> GPS <input type="checkbox"/> EDM TRAVERSE <input type="checkbox"/> TRANSIT TAPE TRAVERSE
<b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b>	<b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b>
NORTHING (Y) = 122062.100 EASTING (X) = 756657.615	NORTHING (Y) = 400426.823 EASTING (X) = 2513883.152
<b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b>	<b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b>
NORTHING (Y) = N/A EASTING (X) = N/A	ELEVATION (FEET) = 546.306 ELEVATION (METERS) = 166.514
<b>MONUMENT DESCRIPTION AND CONDITION</b> RE-BAR AND ALUMINUM CAP	<b>TO REACH DESCRIPTION:</b> IN THE CITY OF WILKES-BARRE AND FROM THE TOWN SQUARE, THE INTERSECTION OF MAIN ST. WITH MARKET ST., 0.1 MILES NW ON MARKET ST. RIGHT ON N. RIVER ST. 0.3 MILES. LEFT ONTO SERVICE ROAD. STATION IS ON THE SW SIDE OF 1 STORY BRICK BUILDING.
	 <p style="text-align: center;">△ = CAMERA POSITION</p>

# WYOMING VALLEY GPS SURVEY NETWORK DATA

**NAME OF STATION: GA 4**  
 RECOVERED     ESTABLISHED    DATE: JANUARY, 1997

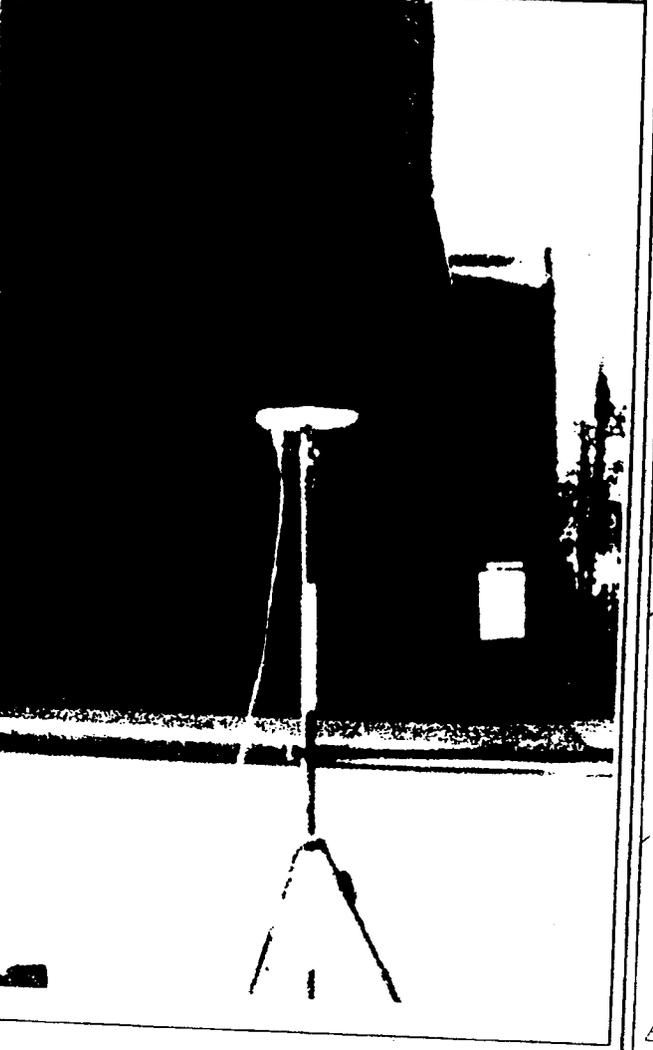
**1983 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)**

NORTHING (Y) = 121041.980  
 EASTING (X) = 755406.686

**WYOMING VALLEY LEVEE  
 PROJECT COORDINATE SYSTEM**

NORTHING (Y) = N/A  
 EASTING (X) = N/A

**MONUMENT DESCRIPTION AND CONDITION**  
 LEAD AND TACK IN CONCRETE



**LOCATION METHOD**  
 GPS     EDM TRAVERSE     TRANSIT TAPE TRAVERSE

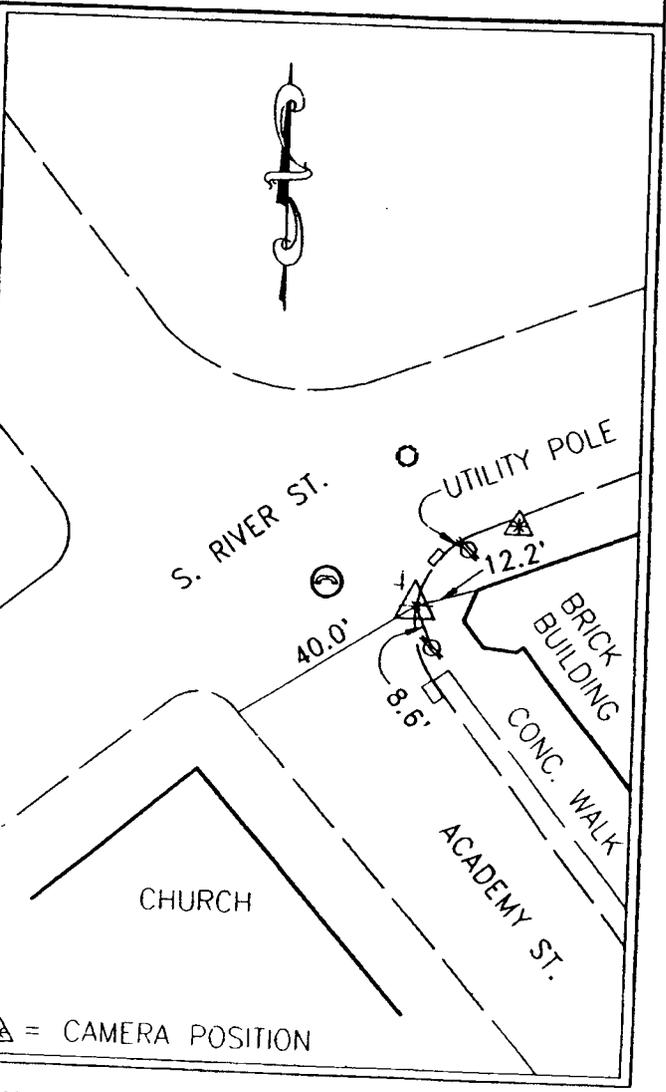
**1927 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)**

NORTHING (Y) = 397079.996  
 EASTING (X) = 2509779.083

**MEAN SEA LEVEL ELEVATION  
 NATIONAL GEODETIC DATUM OF 1929**

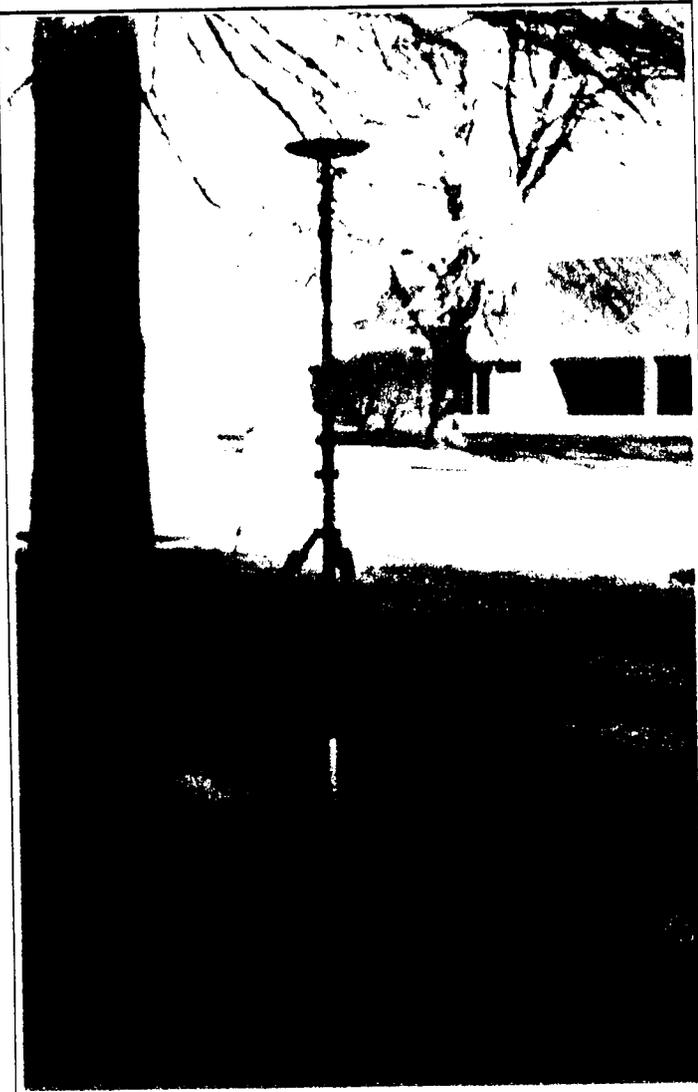
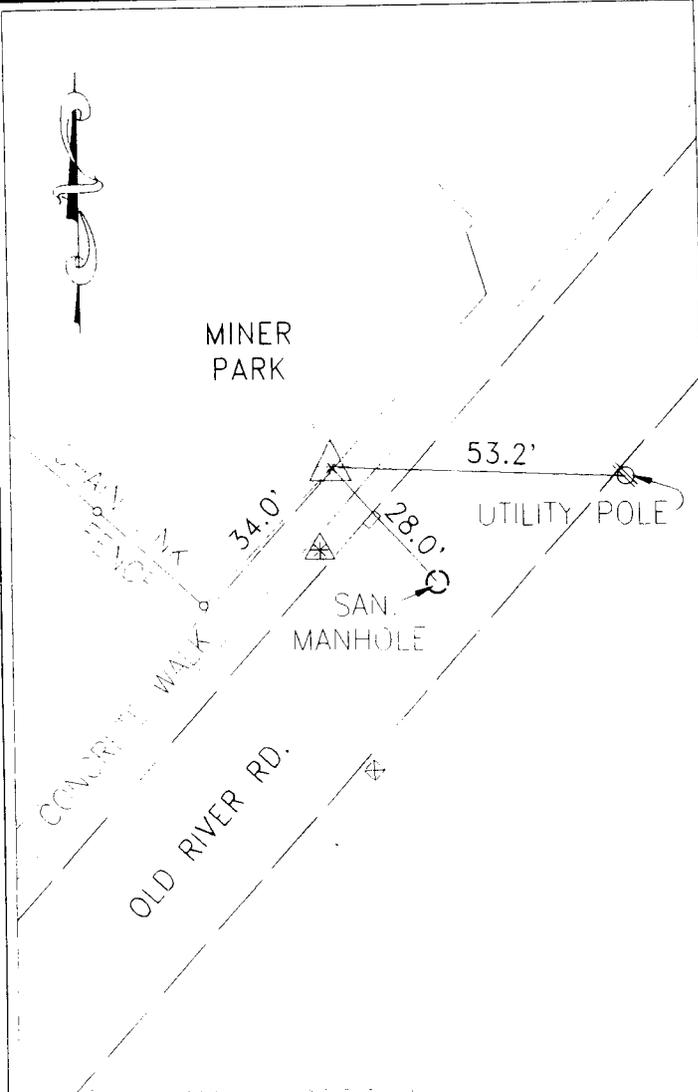
ELEVATION (FEET) = 537.974  
 ELEVATION (METERS) = 163.975

**TO REACH DESCRIPTION:**  
 IN THE CITY OF WILKES-BARRE AND FROM THE TOWN SQUARE, THE INTERSECTION OF MAIN ST. WITH MARKET ST., 0.35 MILES SW ON MAIN ST. RIGHT ON W. SOUTH ST. 0.2 MILES. LEFT ON S. RIVER ST. 0.4 MILES TO THE INTERSECTION WITH ACADEMY ST. STATION IS AT THE EAST CORNER.



SURVEYED BY: WILLIAM H. GORDON ASSOCIATES, INC., 4501 DALY DRIVE, CHANTILLY, VIRGINIA 20151

# WYOMING VALLEY GPS SURVEY NETWORK DATA

<p><b>NAME OF STATION: GA 7</b></p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 120725.247 EASTING (X) = 754076.017</p>	<p>NORTHING (Y) = 396040.853 EASTING (X) = 2505413.401</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b></p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p>
<p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p>ELEVATION (FEET) = 535.671 ELEVATION (METERS) = 163.273</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>RE-BAR AND ALUMINUM CAP</p>	<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.35 MILES NE ON CAREY AVE. CONTINUE NE APPROXIMATELY 200 FEET AFTER ROAD CHANGES TO OLD RIVER RD. STATION IS AT THE NW SIDE OF ROAD AT MINER PARK.</p>
	

SURVEYED BY: **WILLIAM H. GORDON ASSOCIATES, INC.**, 4501 DALY DRIVE, CHANTILLY, VIRGINIA 20151

# WYOMING VALLEY GPS SURVEY NETWORK DATA

**NAME OF STATION:** GA 8  
 RECOVERED     ESTABLISHED    DATE: JANUARY, 1997

**1983 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)**

NORTHING (Y) = 121079.382  
 EASTING (X) = 753555.755

**WYOMING VALLEY LEVEE  
 PROJECT COORDINATE SYSTEM**

NORTHING (Y) = N/A  
 EASTING (X) = N/A

**MONUMENT DESCRIPTION AND CONDITION**  
 CONCRETE WITH BRASS CAP



**LOCATION METHOD**  
 GPS     EDM TRAVERSE     TRANSIT TAPE TRAVERSE

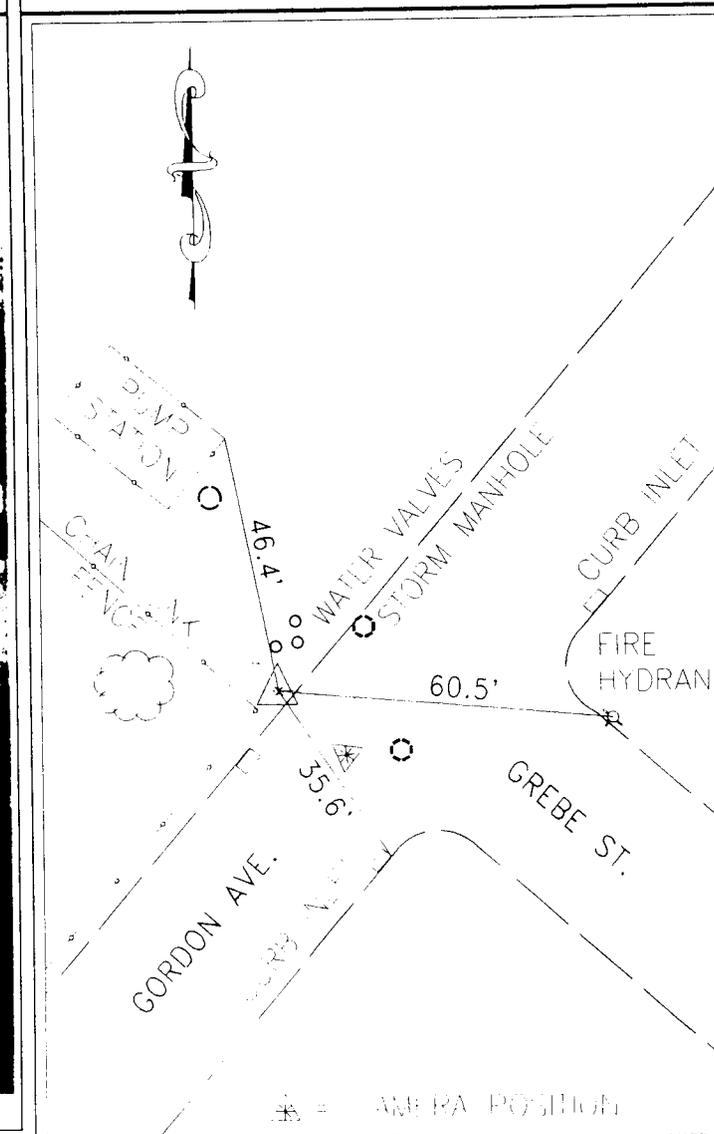
**1927 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)**

NORTHING (Y) = 397202.706  
 EASTING (X) = 2503706.518

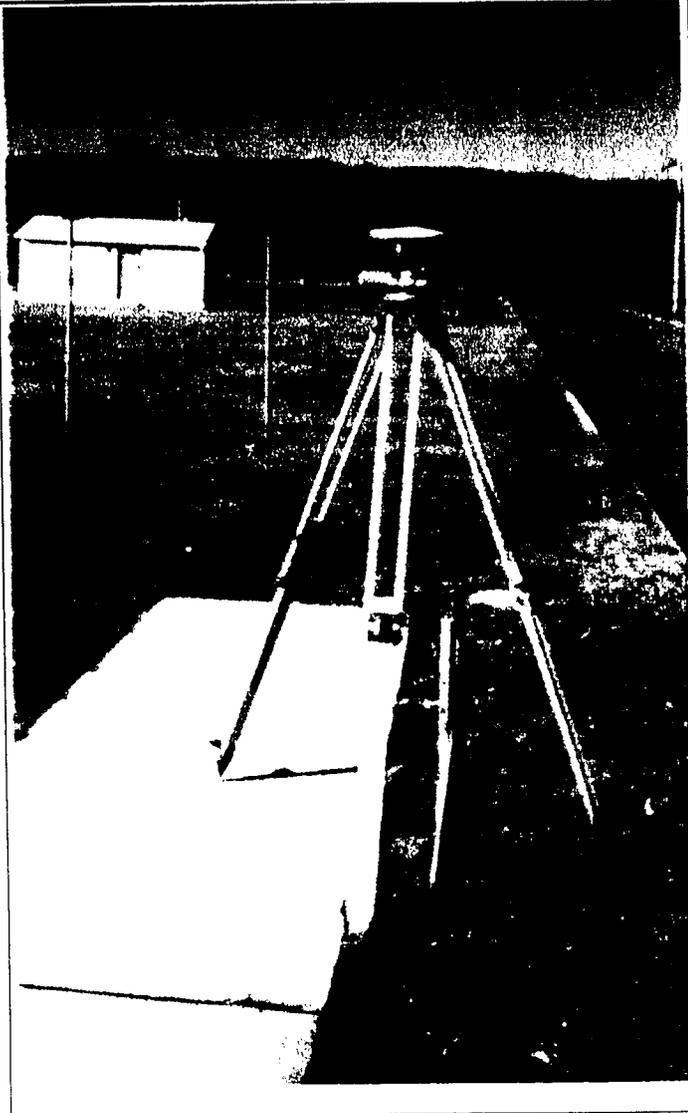
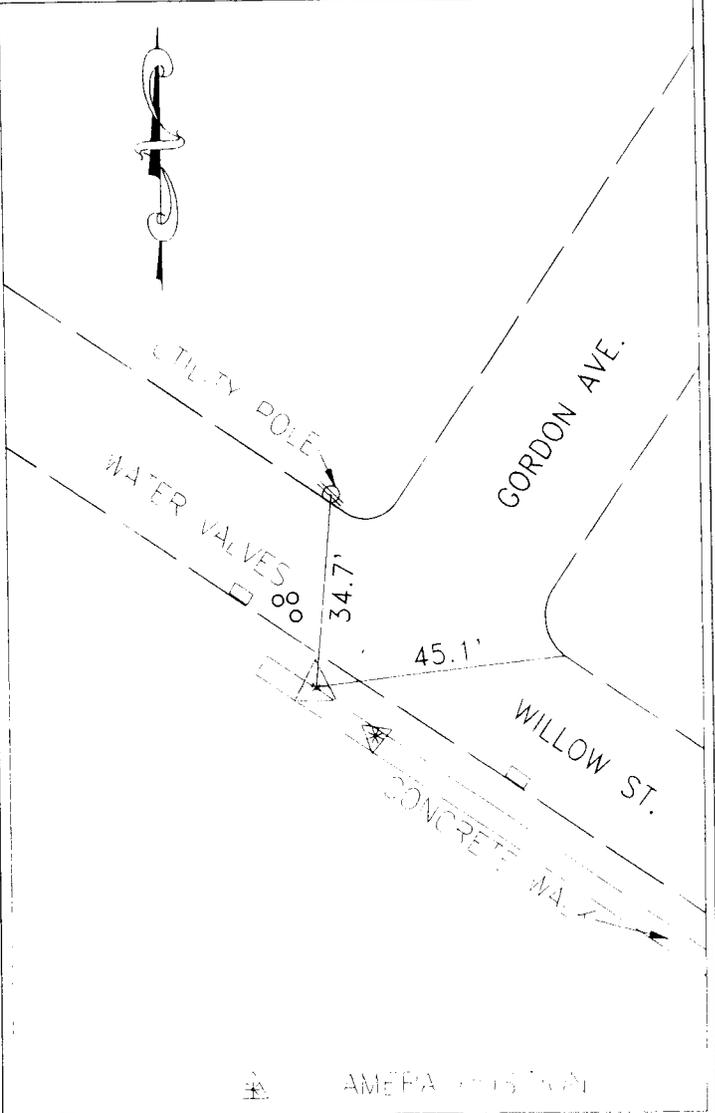
**MEAN SEA LEVEL ELEVATION  
 NATIONAL GEODETIC DATUM OF 1929**

ELEVATION (FEET) = 528.605  
 ELEVATION (METERS) = 161.119

**TO REACH DESCRIPTION:**  
 IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF  
 DIVISION ST. WITH CAREY AVE. 0.35 MILES NE ON CAREY AVE. LEFT ON  
 DAGOBERT ST. 0.35 MILES. RIGHT ON GORDON AVE. 0.05 MILES TO  
 THE INTERSECTION WITH GREBE ST. STATION IS AT THE NW SIDE OF  
 ROAD.



# WYOMING VALLEY GPS SURVEY NETWORK DATA

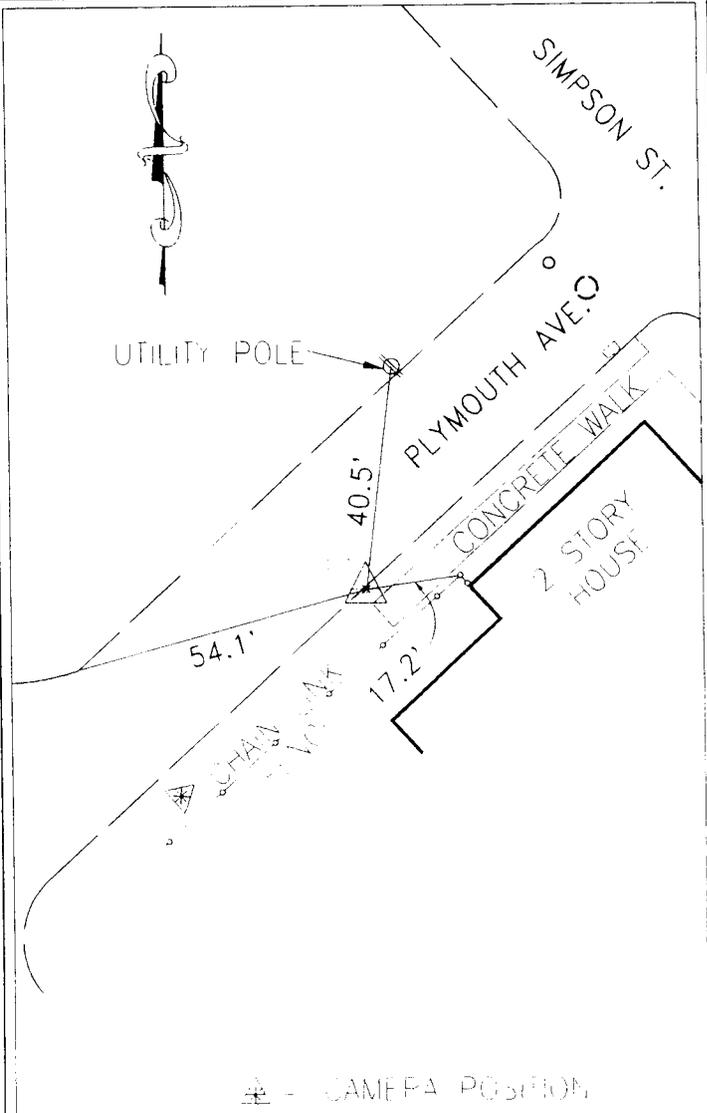
<p><b>NAME OF STATION:</b> GA 9</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 120754.772 EASTING (X) = 753326.268</p>	<p>NORTHING (Y) = 396137.719 EASTING (X) = 2502953.612</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEL PROJECT COORDINATE SYSTEM</b></p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p>
<p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p>ELEVATION (FEET) = 527.733 ELEVATION (METERS) = 160.853</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>RE-BAR AND ALUMINUM CAP</p>	<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.35 MILES NE ON CAREY AVE. LEFT ON DAGOBERT ST. 0.35 MILES. LEFT ON GORDON AVE. 0.2 MILES TO THE INTERSECTION WITH WILLOW ST. THE STATION IS AT THE SW SIDE OF WILLOW ST.</p>
	

SURVEYED BY: **WILLIAM H. GORDON ASSOCIATES, INC.**, 4501 DALY DRIVE, CHANTILLY, VIRGINIA 20151

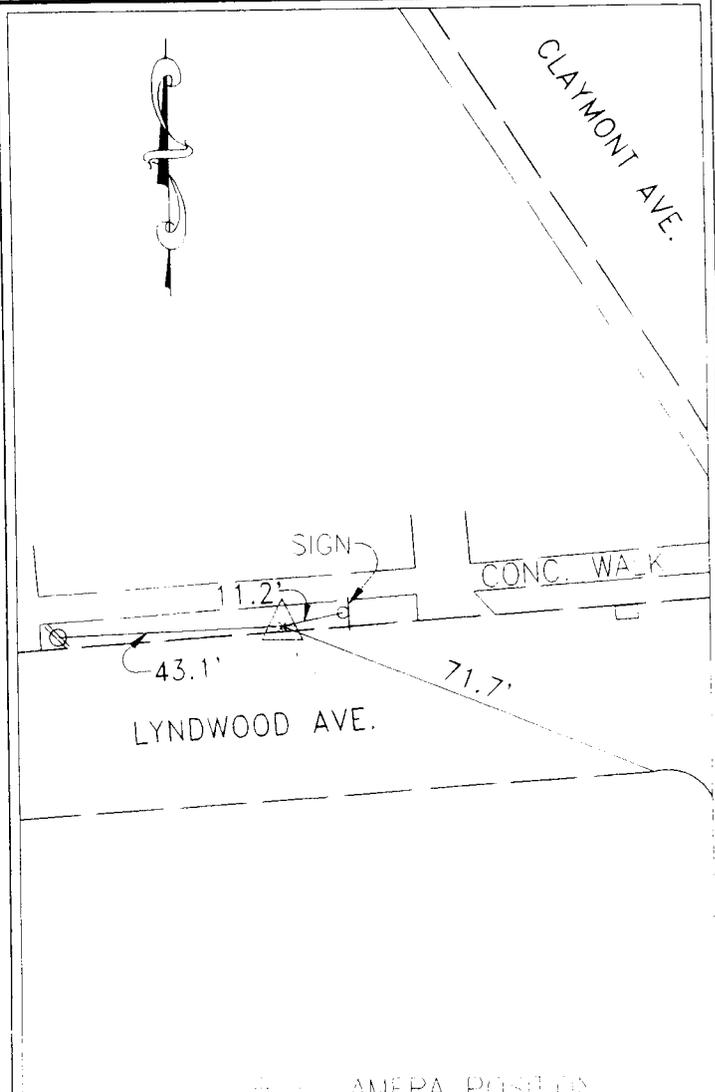
# WYOMING VALLEY GPS SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 10</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p> <p>NORTHING (Y) = 120661.357 EASTING (X) = 753454.112</p>	<p><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p> <p>NORTHING (Y) = 395831.242 EASTING (X) = 2503373.043</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b></p> <p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 532.269 ELEVATION (METERS) = 162.236</p>
<p><b>MONUMENT DESCRIPTION AND CONDITION</b> RE-BAR AND ALUMINUM CAP</p>	<p><b>TO REACH DESCRIPTION:</b> IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.1 MILES NE ON CAREY AVE. LEFT ON SIMPSON ST. 0.25 MILES. RIGHT ON PLYMOUTH AVE. 0.1 MILES TO THE INTERSECTION WITH WILLOW ST. STATION IS AT THE WEST CORNER.</p>
	

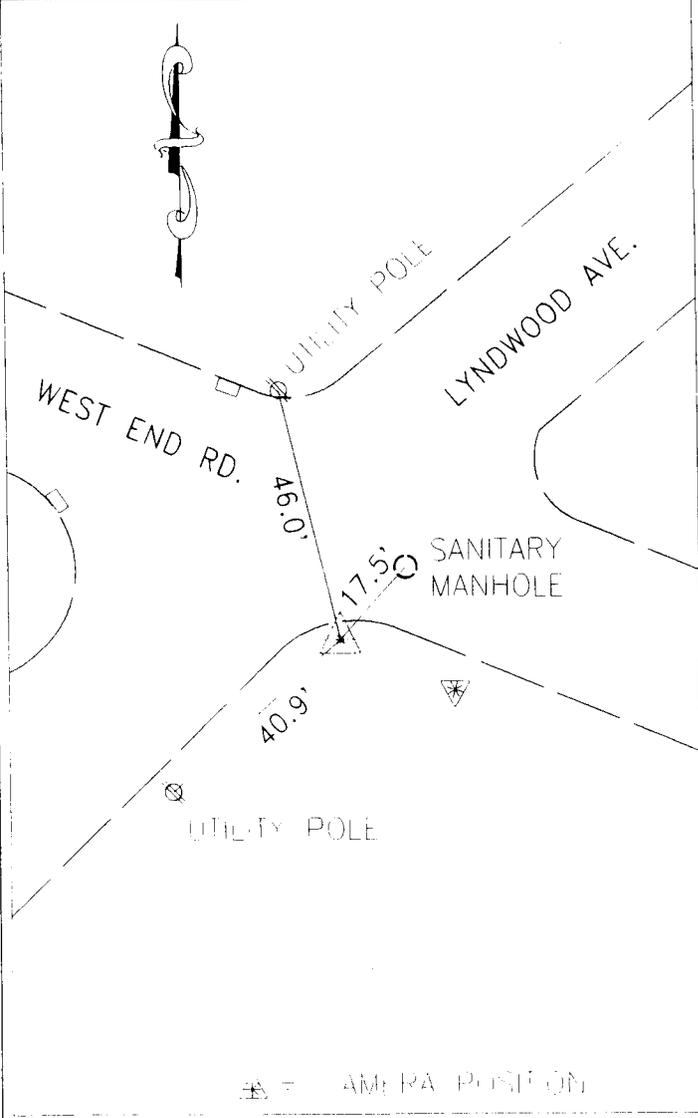
# WYOMING VALLEY GPS SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 11</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p> <p>NORTHING (Y) = 120505.109 EASTING (X) = 753352.410</p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p> <p>NORTHING (Y) = 395318.619 EASTING (X) = 2503039.379</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b></p> <p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 533.380 ELEVATION (METERS) = 162.575</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>RE-BAR AND ALUMINUM CAP</p>	<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.1 MILES NE ON CAREY AVE. LEFT ON SIMPSON ST. 0.25 MILES. LEFT ON PLYMOUTH AVE. STATION IS AT THE SE SIDE OF PLYMOUTH AVE. APPROXIMATELY 70 FEET FROM THE INTERSECTION WITH SIMPSON ST.</p>
	 <p style="text-align: center;">▲ - CAMERA POSITION</p>

# WYOMING VALLEY GPS SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 12</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 120480.372 EASTING (X) = 753203.238</p>	<p>NORTHING (Y) = 395237.462 EASTING (X) = 2502549.972</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b></p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p>
<p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p>ELEVATION (FEET) = 530.256 ELEVATION (METERS) = 161.622</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>RE-BAR AND ALUMINUM CAP</p>	<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.1 MILES SW ON CAREY AVE. RIGHT ON WEST END RD. 0.4 MILES. RIGHT ON LYNDWOOD AVE 0.3 MILES. STATION IS AT THE NORTH SIDE OF ROAD.</p>
	

# WYOMING VALLEY GPS SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 13</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JANUARY, 1997</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p style="text-align: center;"><input checked="" type="checkbox"/> GPS    <input type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 120286.164 EASTING (X) = 752832.734</p>	<p>NORTHING (Y) = 394600.301 EASTING (X) = 2501334.417</p>
<p style="text-align: center;"><b>WYOMING VALLEY LEVEE PROJECT COORDINATE SYSTEM</b></p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p>
<p>NORTHING (Y) = N/A EASTING (X) = N/A</p>	<p>ELEVATION (FEET) = 537.019 ELEVATION (METERS) = 163.684</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>CONCRETE WITH BRASS CAP</p>	<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WILKES-BARRE AND FROM THE INTERSECTION OF DIVISION ST. WITH CAREY AVE. 0.1 MILES SW ON CAREY AVE. RIGHT ON WEST END RD. 0.4 MILES TO THE INTERSECTION WITH LYNDWOOD AVE. STATION IS AT THE SOUTH CORNER.</p>
	

SURVEYED BY: **WILLIAM H. GORDON ASSOCIATES, INC.**, 4501 DALY DRIVE, CHANTILLY, VIRGINIA 20151

# WYOMING VALLEY GPS SURVEY NETWORK DATA

**NAME OF STATION:** GA 37  
 RECOVERED     ESTABLISHED    DATE: JANUARY, 1997

**1983 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)**

NORTHING (Y) = 122455.106  
 EASTING (X) = 756677.034

**WYOMING VALLEY LEVEE  
 PROJECT COORDINATE SYSTEM**

NORTHING (Y) = N/A  
 EASTING (X) = N/A

**MONUMENT DESCRIPTION AND CONDITION**  
 LEAD AND TACK IN CONCRETE



**LOCATION METHOD**  
 GPS     EDM TRAVERSE     TRANSIT TAPE TRAVERSE

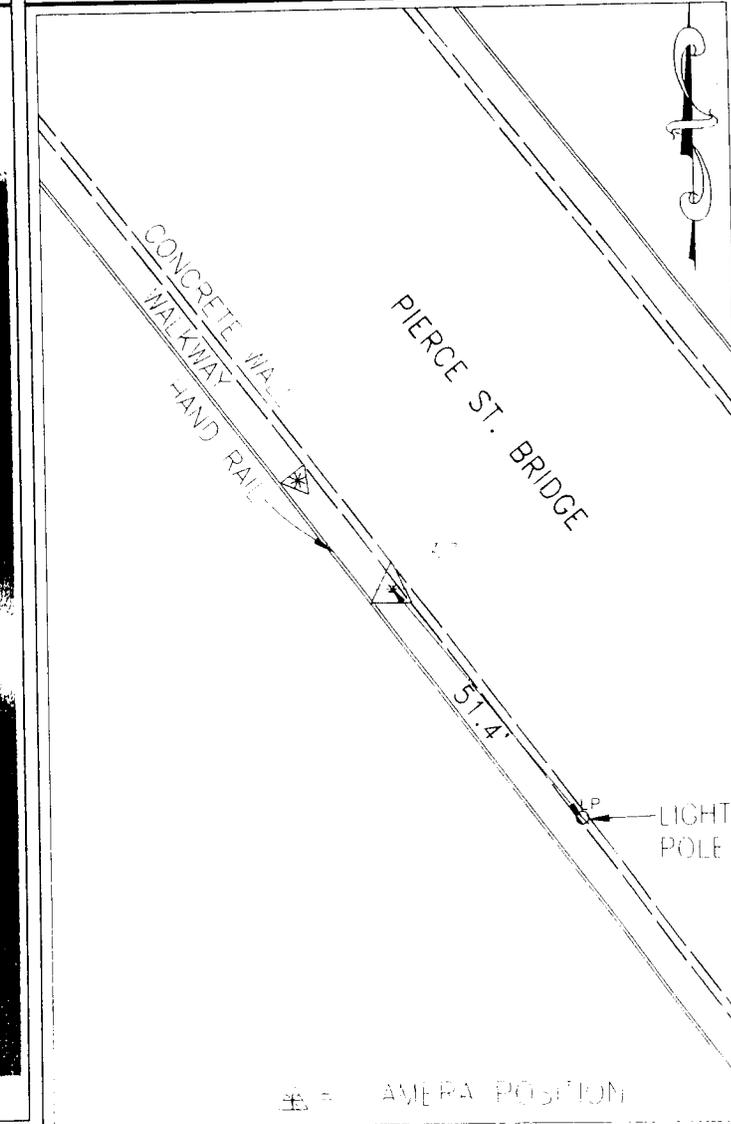
**1927 NORTH AMERICAN DATUM, NORTH ZONE  
 PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)**

NORTHING (Y) = 401716.202  
 EASTING (X) = 2513946.862

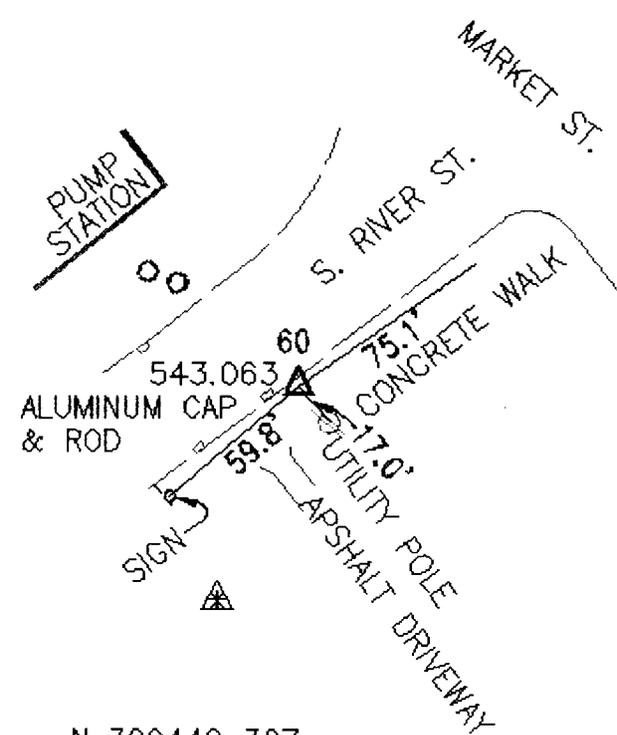
**MEAN SEA LEVEL ELEVATION  
 NATIONAL GEODETIC DATUM OF 1929**

ELEVATION (FEET) = 575.146  
 ELEVATION (METERS) = 175.305

**TO REACH DESCRIPTION:**  
 IN KINGSTON BORRO AND FROM THE INTERSECTION OF MARKET ST.  
 WITH WYOMING AVE. 0.4 MILES NE ON WYOMING AVE. RIGHT ON  
 PIERCE ST. 1.0 MILES. STATION IS AT THE SW SIDE OF PIERCE STREET  
 BRIDGE IN SIDEWALK.



## WYOMING VALLEY SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 60</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JULY, 2001</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input type="checkbox"/> GPS    <input checked="" type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 2400820.045 EASTING (X) = 3719435.592</p>	<p>NORTHING (Y) = 399,440.307 EASTING (X) = 2,512,909.666</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>CORPS OF ENGINEERS-U.S. ARMY SURVEY MARK ALUMINUM CAP AND ROD DRIVEN 12 FEET DEEP. MONUMENT SET WITH COVER PLATE AT 0.2 FEET BELOW GRADE.</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 543.063 ELEVATION (METERS) = 165.526</p>
<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WIKES-BARRE AND FROM THE TOWN SQUARE, THE INTERSECTION OF MAIN ST. WITH MARKET ST., GO 0.1 MILES NW ON MARKET ST. TURN LEFT ON S. RIVER ST. STATION IS ON THE SE SIDE OF S. RIVER ST. APPROXIMATELY 100' FROM MARKET ST.</p>	 <p style="text-align: center;">N 399440.307 E 2512909.666</p>

## WYOMING VALLEY SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 61</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JULY, 2001</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input type="checkbox"/> GPS    <input checked="" type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p style="text-align: center;"><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p>	<p style="text-align: center;"><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p>
<p>NORTHING (Y) = 2400443.806 EASTING (X) = 3718941.586</p>	<p>NORTHING (Y) = 398,218.518 EASTING (X) = 2,511,282.086</p>
<p style="text-align: center;"><b>MONUMENT DESCRIPTION AND CONDITION</b></p> <p>CORPS OF ENGINEERS-U.S. ARMY SURVEY MARK ALUMINUM CAP AND ROD DRIVEN 12 FEET DEEP. MONUMENT SET WITH COVER PLATE AT 0.2 FEET BELOW GRADE.</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 541.160 ELEVATION (METERS) = 164.946</p>
<p style="text-align: center;"><b>TO REACH DESCRIPTION:</b></p> <p>IN THE CITY OF WIKES-BARRE AND FROM THE TOWN SQUARE, THE INTERSECTION OF MAIN ST. WITH MARKET ST., GO 0.35 MILES NW ON MARKET ST. TURN RIGHT ON W. SOUTH ST. 0.2 MILES TO THE INTERSECTION WITH S. RIVER ST. STATION IS THE SOUTH CORNER.</p>	<div style="text-align: center;"> <p>ALUMINUM CAP &amp; ROD</p> <p>N 398218.518 E 2511282.086</p> </div>

## WYOMING VALLEY SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 62</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JULY, 2001</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input type="checkbox"/> GPS    <input checked="" type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p> <p>NORTHING (Y) = 2399143.079 EASTING (X) = 3716170.262</p>	<p><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p> <p>NORTHING (Y) = 394,018.911 EASTING (X) = 2,502,169.871</p>
<p><b>MONUMENT DESCRIPTION AND CONDITION</b> CORPS OF ENGINEERS-U.S. ARMY SURVEY MARK ALUMINUM CAP AND ROD DRIVEN 12 FEET DEEP. MONUMENT SET WITH COVER PLATE AT 0.2 FEET BELOW GRADE.</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 534.081 ELEVATION (METERS) = 162.788</p>
<p><b>TO REACH DESCRIPTION:</b> FROM THE INTERSECTION OF WEST END ROAD AND CAREY AVENUE IN HANOVER TOWNSHIP, PROCEED NW ON WEST END ROAD 0.2 MILES. STATION IS ON THE SOUTH SIDE OF ROAD APPROXIMATELY 200 FEET WEST OF RAILROAD BRIDGE.</p>	<p style="text-align: right; margin-top: 20px;">N 394018.911 E 2502169.871</p>

## WYOMING VALLEY SURVEY NETWORK DATA

<p><b>NAME OF STATION:</b> GA 63</p> <p><input type="checkbox"/> RECOVERED    <input checked="" type="checkbox"/> ESTABLISHED    DATE: JULY, 2001</p>	<p style="text-align: center;"><b>LOCATION METHOD</b></p> <p><input type="checkbox"/> GPS    <input checked="" type="checkbox"/> EDM TRAVERSE    <input type="checkbox"/> TRANSIT TAPE TRAVERSE</p>
<p><b>1983 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (METERS)</b></p> <p>NORTHING (Y) = 2400066.810 EASTING (X) = 3715252.346</p>	<p><b>1927 NORTH AMERICAN DATUM, NORTH ZONE PENNSYLVANIA STATE COORDINATE SYSTEM (FEET)</b></p> <p>NORTHING (Y) = 397,067.277 EASTING (X) = 2,499,182.683</p>
<p><b>MONUMENT DESCRIPTION AND CONDITION</b> CORPS OF ENGINEERS-U.S. ARMY SURVEY MARK ALUMINUM CAP AND ROD DRIVEN 12 FEET DEEP. MONUMENT SET WITH COVER PLATE AT 0.2 FEET BELOW GRADE.</p>	<p style="text-align: center;"><b>MEAN SEA LEVEL ELEVATION NATIONAL GEODETIC DATUM OF 1929</b></p> <p>ELEVATION (FEET) = 550.675 ELEVATION (METERS) = 167.846</p>
<p><b>TO REACH DESCRIPTION:</b> FROM THE INTERSECTION OF WEST END ROAD WITH MAIN STREET IN PLYMOUTH TOWNSHIP, GO SE ON WEST END ROAD 0.1 MILES TO THE INSERTSECTION WITH BEADE STREET. STATION IS ON THE SE CORNER IN FRONT OF THE WHITE BRICK BUILDING.</p>	<div style="text-align: center;"> <p>○ SMOKE STACK</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>N 397067.277 E 2499182.683</p> </div>

## SECTION 01060

SAFETY  
01/01

## PART 1 GENERAL

## 1.1 APPLICABLE PUBLICATION

The publications listed below form a part of this specification and are referred to in the text by the basic designation only. All interim changes (changes made between publications of new editions) to the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, will be posted on the Headquarters Website. The date that it is posted shall become the official effective date of the change and contracts awarded after this date shall require to comply accordingly. The website location where these changes can be found is under the button entitled "Changes to EM", located at: "[http://www.hq.usace.army.mil/soh/hqusace\\_soh.htm](http://www.hq.usace.army.mil/soh/hqusace_soh.htm)".

## U.S. ARMY CORPS OF ENGINEERS:

EM 385-1-1 (3 Sep 1996) U.S. Army Corps of Engineers  
Safety and Health Requirements Manual

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Safety Supervisor; G AR.

A safety supervisor shall be responsible for overall supervision of accident prevention activities.

## SD-07 Certificates

Language Certification

It is the Contractors responsibility to ensure that all employees understand the basic english language.

## SD-09 Reports

Activity Phase Hazard Analysis Plan; G AR.

The addressing of the activity phase hazard analysis plan for each activity performed in a phase of work.

#### Outline Report

A report for each past activities review.

#### OSHA Log

A log shall be reported monthly for injuries.

### 1.3 GENERAL

The U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, and all subsequent revisions referred to in the Contract Clause ACCIDENT PREVENTION of this contract, are hereby supplemented as follows:

a. The Contractor shall designate an employee responsible for overall supervision of accident prevention activities. Such duties shall include: (1) assuring applicable safety requirements are (a) communicated to the workers in a language they understand (reference EM 385-1-1, September 1996, 01.A.04). It is the Contractor's responsibility to ascertain if there are workers on the job who do not speak and/or understand the English language, if such workers are employed by the prime contractor or subcontractors, at any tier, it is the prime contractor's responsibility to insure that all safety programs, signs, and tool box meetings are communicated to the workers in a language they understand, and that a bilingual employee is on site at all time. If the contractor contends that interpreters and/or bilingual signs are not required, language certification must be provided which verifies that all workers (whose native tongue is other than English) have a command of the English language sufficient to understand all direction, training and safety requirements, whether written or oral, and (b) incorporated in work methods, and (2) inspecting the work to ensure that safety measures and instructions are actually applied. The proposed safety supervisor name and qualifications shall be submitted in writing for approval to the Contracting Officer's Representative. This individual must have prior experience as a safety engineer or be able to demonstrate his/her familiarity and understanding of the safety requirements over a prescribed trial period. The safety engineer shall have the authority to act on behalf of the Contractor's general management to take whatever action is necessary to assure compliance with safety requirements. The safety supervisor is required to be on the site when work is being performed.

b. Prior to commencement of any work at a job site, a preconstruction safety meeting shall be held between the Contractor and the Corps of Engineers Area/Resident Engineer to discuss the Contractor's safety program and in particular to review the following submittals:

(1) Contracts Accident Prevention Plan: An acceptable accident prevention plan, written by the prime Contractor for the specific work and implementing in detail the pertinent requirements of EM 385-1-1, shall be submitted for Government approval.

(2) Activity Phase Hazard Analysis Plan: Prior to beginning each major phase of work, an activity hazard analysis (phase plan) shall be prepared by the Contractor for that phase of work and submitted to the Contracting Officer's Representative for approval. A phase is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform work. The analysis shall address the hazards for each activity performed in the phase and shall present the procedures and safeguards necessary to eliminate the hazards or reduce the risk to an acceptable level.

c. Subsequent jobsite safety meetings shall be held as follows:

(1) A safety meeting shall be held at least once a month for all supervisors on the project to review past activities, to plan ahead for new or changed operations and to establish safe working procedures to anticipated hazards. An outline report of each monthly meeting shall be submitted to the Contracting Officer's Representative.

(2) At least one safety meeting shall be conducted weekly, or whenever new crews begin work, by the appropriate field supervisors or foremen for all workers. An outline report of the meeting giving date, time, attendance, subjects discussed and who conducted it shall be maintained and copies furnished the designated authority on request.

#### 1.4 ACCIDENTS

Chargeable accidents are to be investigated by both Contractor personnel and the Contracting Officer.

##### 1.4.1 Accident Reporting, ENG FORM 3394

Section 1, Paragraph 01.D, OF EM 385-1-1 and the Contract Clause entitled ACCIDENT PREVENTION are amended as follows: The prime Contractor shall report on Eng Form 3394, supplied by the Contracting Officer, all injuries to his employees or subcontractors that result in lost time and all damage to property and/or equipment in excess of \$2,000 per incident. Verbal notification of such accident shall be made to the Contracting Officer within 24 hours. A written report on the above noted form shall be submitted to the Contracting Officer within 72 hours following such accidents. The written report shall include the following:

a. A description of the circumstances leading up to the accident, the cause of the accident, and corrective measures taken to prevent recurrence.

b. A description of the injury and name and location of the medical facility giving examination and treatment.

c. A statement as to whether or not the employee was permitted to return to work after examination and treatment by the doctor, and if not, an estimate or statement of the number of days lost from work. If there have been days lost from work, state whether or not the employee has been re-examined and declared fit to resume work as of the date of the report.

## 1.4.2 OSHA Requirements

## 1.4.2.1 OSHA Log

A copy of the Contractor's OSHA Log of Injuries shall be forwarded monthly to the Contracting Officer.

## 1.4.2.2 OSHA Inspections

Contractors shall immediately notify the Contracting Officer when an OSHA Compliance official (Federal or State representative) presents his/her credentials and informs the Contractor that the workplace will be inspected for OSHA compliance. Contractors shall also notify the Contracting Officer upon determination that an exit interview will take place upon completion of the OSHA inspection. (NABSA OCT 05, 1976)

## 1.5 GOVERNMENT APPROVAL

Submittals shall be in accordance with Section 01330 SUBMITTAL PROCEDURES. All required submittals of items specified in this section shall be for information only, except for those items including, but not limited to, the following which shall be submitted for Government approval:

- a. Written designation of safety representative.
- b. Written project specific accident prevention plan.
- c. Written activity phase hazard analysis plan.

PART 2 PRODUCT  
NOT APPLICABLE

PART 3 EXECUTION  
NOT APPLICABLE

-- End of Section --

## SECTION 01270

MEASUREMENT AND PAYMENT  
02/94

## PART 1 GENERAL

## 1.1 SCOPE

This section covers the methods and procedures which will be used to measure the Contractor's work and to effect payment.

## 1.2 GENERAL

The general outline of the principal features of each item as listed does not in any way limit the responsibility of the Contractor for making a thorough investigation of the drawings and specifications to determine the scope of work under the entire contract. Payment to the Contractor of the amounts based on the quantities of work as measured in accordance with the specified methods of measurement and the prices stipulated in the accepted proposal will constitute complete compensation for all work shown on the drawings, provided in the specifications or other Contract Documents and all costs of accepting the general risks, liabilities and obligations expressed or implied. Payment under all items shall include, but not necessarily be limited to, compensation for furnishing all supervision, labor, equipment, materials and services (including overhead and profit), as well as performing all work required to accomplish and complete the work specified under each item and other work required.

## 1.3 LUMP SUM PAYMENT ITEMS

## 1.3.1

The quantities under lump sum items will not be measured except for the purpose of determining reasonable interim payments.

## 1.3.2

Interim payments will be made in accordance with the estimated value of work done as determined by the Contracting Officer or as specified in this section, and in accordance with CONTRACT CLAUSE for PAYMENTS.

## 1.4 PAYMENT ITEMS

## 1.4.1 COURTHOUSE CLOSURE STRUCTURE (ITEM NO.0001)

No separate measurement shall be made for the Courthouse Closure Structure. Payment for the Courthouse Closure Structure shall be made at the contract lump sum price for the Courthouse Closure Structure, complete. The Courthouse Closure Structure shall include all work between the Courthouse

at Station 0+00 and the Union St. Pump Station at Station 10+00, except for the H-pile and the removal of the temporary closure as specified herein. The lump sum price shall include care and diversion of water during construction, excavation, embankment and backfill materials, topsoil, seeding, steel sheet piles concrete, reinforcing steel, concrete and plastic pipe, joints, aluminum closure panels and steel post, miscellaneous metals, railings, storm drainage system, demolition, paving, Erosion and Sediment Control and full compensation for all plant, labor, materials, equipment, and all incidental items necessary to complete the work as shown on the drawings. Also included in the lump sum price shall be all modifications to the existing stream tunnel and utilities. All cost associated with the monitoring, bracing, and protection of the existing Courthouse stone wall will be paid for as part of the contract lump sum price, which shall constitute full payment for furnishing all labor, material, equipment, and instruments, as well as technical services necessary to meet contract requirements applicable to conducting, monitoring (vibration and settlement), surveying, recording, evaluating, completing damage surveys, and the bracing of the stone wall. The lump sum price shall also include the test installation of the new Courthouse closure structure and the submission of Emergency Action Plan for the Courthouse temporary emergency closure. H-piles shall be paid for separately under the applicable pay items in Paragraph STEEL H-PILES. Construction shall be in accordance with applicable portions of the Specifications and the drawings. Payment shall be made at the lump sum price for Item No. 0001, "Courthouse Closure Structure" of the Unit Price Schedule.

#### 1.4.2 STEEL H-PILES (ITEM NO.0002)

Steel H-Piles shall be as defined in Section 02456 of the specifications.

##### 1.4.2.1 Measurement

- a. Mobilization and Demobilization: No separate measurement will be made for mobilization and demobilization for pile installation.
- b. Steel H-Piles: Steel H-Piles will be measured for payment on the basis of the length in feet along the axis of the pile in place below the cut-off elevation. The length shall include the thickness of the cap plate and pile points. Pile lengths will be measured to the nearest tenth of a foot.
- c. Splices: Splices will be measured by each splice completed.
- d. Pulled Piles: Piles Withdrawn will be measured for payment on the basis of the length in feet along the axis of the pile as driven. The length shall include the thickness of any pile points. Pile lengths will be measured to the nearest tenth of a foot.

##### 1.4.2.2 Payment

The contract unit prices for each of the various items of work shall constitute full compensation for furnishing all plant, labor, equipment, materials, and supplies, and performing all operations specified herein,

shown on the drawings, directed by the Contracting Officer, or are otherwise required to satisfactorily complete each item of work. All costs required to complete the work in Section 02456 which are not otherwise specified for separate payment shall be considered incidental to and included in the contract prices for the various items of work in the Unit Price Schedule. The Contracting Officer shall have the right to increase or decrease the number and length of piles to be furnished and installed, by changing the foundation pile locations or elevations, requiring the installation of additional piles, or requiring omission of piles from the requirements shown and specified. Whether or not such changes are made, the Contractor shall be paid at the applicable contract unit price per linear foot multiplied by the total number of linear feet actually installed.

a. Mobilization and Demobilization: All costs associated with the mobilization and demobilization will be paid for at the contract lump sum price under Item No. 0002AA, "Steel H-Piles, Mobilization and Demobilization", of the Unit Price Schedule, which shall include payment for transporting equipment and materials to the site and removing this equipment and materials from the site at the completion of the work.

b. Pile Lengths: Payment for each pile acceptably driven will be made at the applicable contract price per linear foot for Item No. 0002AB, "Steel H-Piles - Pile Lengths," for the length of pile specified or directed to be driven; this price includes all items incidental to driving piles, surveys, splicing of the piles (except as specified below), redriving heaved piles, cutting off all piles at the cut-off elevation, furnishing piles and pile points. The Contractor will not be allowed payment for cut-off lengths, damaged, withdrawn, broken, or rejected piles, except for piles determined by the Contracting Officer to be obstructed.

c. Splices: The Contractor will be paid for work required to make each authorized pile splice at the applicable contract price for Item No. 0002AC "Steel H-Pile - Pile Splices". Payment will be made for no more than 1 splice per pile.

d. Pulled Piles:

(1) Piles furnished by the Contractor which are pulled at the direction of the Contracting Officer and found to be in good condition will be paid for at the applicable contract unit price for Item No. 0002AD, "Steel H-Piles - Pile Withdrawal," of the Unit Price Schedule. Such pulled piles when redriven will be paid for at 50 percent of the applicable contract unit price for furnishing and driving the piles.

(2) Where a pile is pulled and found to be damaged, no payment will be made for either originally furnishing and driving such pile or for the operation of pulling. A new pile shall be driven in place of the damaged pile if so directed. The new pile will be paid for at the applicable contract unit price.

#### 1.4.3 REMOVAL OF TEMPORARY CLOSURE (ITEM NO. 0003)

No separate measurement shall be made for Removal of the Temporary Closure Section. Payment for Removal of the Temporary Closure Section shall include demolition, stripping, excavation, layout, , including pre-construction and post construction surveys, and removal as shown on the drawings and described in the specifications. The lump sum price shall include, but not be limited to, removing the PZ22 sheet pile and steel H-piles, impervious fill, topsoil, seeding, replacement of the stockpiled existing stone wall cap and concrete gutter, delivery, transportation, stockpiling, and handling, temporary piles for templates, all items of work, labor, equipment and materials necessary to complete Removal of the Temporary Closure Section, as shown on the drawings and in accordance with all applicable portions of the specifications. All other costs for removal and restoring levee, wall and roadway to the horizontal and vertical alignment shown and all work incidental to Removal of the of the Temporary Closure as determined by the Contracting Officer. Payment for all work necessary to complete Removal of the Temporary Closure shall be made at the Lump Sum price for Item No. 0003, "Removal of Temporary Closure" of the Unit Price Schedule.

1.4.4 SOLOMON CREEK RAILROAD CLOSURE STRUCTURE MODIFICATIONS - ITEM NO. 0004 (OPTION)

No separate measurement shall be made for the modifications to the Solomon Creek railroad closure structure. Payment for the railroad closure structure modifications shall be made at the contract lump sum price for the railroad closure structure, complete. The lump sum price shall include care and diversion of water during construction, excavation, embankment and backfill materials, topsoil, seeding, 2A coarse aggregate, concrete, reinforcing steel, formwork, dowels, anchors, aluminum stoplogs, ladders, stoplog storage building, miscellaneous metals, erosion and sediment control, and full compensation for all plant, labor, materials, equipment, and all incidental items necessary to complete the work as shown on the drawings. The lump sum price shall also include the test installation of the new/modified Solomon Creek closure structure , and all cost associated with coordination, permits, and agreements with the railroad and the cost for flagmen required by the railroad. Include in the lump price shall also be all work associated with the temporary emergency closure structure at Solomon Creek, which shall include the Emergency Action Plan, materials, equipment, and the test installation for the temporary emergency closure. Construction shall be in accordance with applicable portions of the Specifications and the drawings. Payment shall be made at the lump sum price for the Item No. 0004, "Solomon Creek Railroad Closure Structure Modifications" of the Unit Price Schedule.

1.4.5 WILLOW STREET RELIEF CULVERT MODIFICATIONS - ITEM NO. 0005 (OPTION)

No separate measurement shall be made for the modifications to the Willow Street relief culvert. Payment for the relief culvert modifications shall be made at the contract lump sum price for the relief culvert modifications, complete. The lump sum price shall include care and diversion of water during construction, sluice gates, gate frames, stems and stem guides, removal, modification and replacement of flap gates, concrete, reinforcing steel, formwork, dowels, anchors, sealant, joint

material, concrete finishing, miscellaneous metals, locks, railings, Erosion and Sediment Control, and full compensation for all plant, labor, materials, equipment, and all incidental items necessary to complete the work as shown on the drawings. Costs for full compliance with confined space entry shall also be included. Also included in the lump sum price shall be the removal of all debris and materials within the existing relief culvert and any required cleaning and preparation of the existing concrete in contact with new concrete. Any required excavation or removal and replacement of the existing riprap and fill shall be included in the lump sum price. Construction shall be in accordance with applicable portions of the Specifications and the drawings. Payment shall be made at the lump sum price for Item No. 0005, "Willow Street Relief Culvert Modifications" of the Unit Price Schedule.

1.4.6 WILLOW STREET RELIEF CULVERT ACCESS ROAD -ITEM NO. 0006 (OPTION)

Measurement shall be by the ton of rock fill, acceptably placed, for the construction of the Willow Street Relief Culvert Access Road. The unit price shall include care and diversion of water during construction, erosion and sediment control, clearing, and full compensation for all plant, labor, materials, equipment, and all incidental items necessary to complete the work as shown on the drawings. Construction shall be in accordance with applicable portions of the Specifications and the drawings. Payment shall be made at the contract unit price for Item No. 0006, "Willow Street Relief Culvert Access Road - Rock Fill Material" of the Unit Price Schedule.

1.4.7 EMERGENCY CLOSURE CONSTRUCTION - COURTHOUSE - ITEM NO. 0007 (OPTION)

No separate measurement shall be made for the Emergency Closure Construction. The Contractor shall base his price on installing stoplogs, fill materials and EPDM sheeting to close the opening of the temporary closure section. Payment for the Emergency Closure Construction shall include all work, labor, equipment and materials including, but not limited to, sandbags, backfill material, or other approved materials required to construct an temporary emergency closure during a flood emergency at the direction of the Contracting Officer. Removal of all closure materials and debris after the flood emergency shall also be included and at the direction of the Contracting Officer. Payment to complete the Emergency Closure shall be made at the Lump Sum price for Item No. 0007 "Emergency Closure Construction - Courthouse", of the Unit Price Schedule.

1.4.8 EMERGENCY CLOSURE CONSTRUCTION - SOLOMON CREEK - ITEM NO. 0008 (OPTION)

No separate measurement shall be made for the Emergency Closure Construction. The Contractor shall base his price on installing the temporary closure structure at the Solomon Creek Closure. Payment for the Emergency Closure Construction shall include all work, labor, equipment and materials including, but not limited to, sandbags, backfill material, or other approved materials required to construct an temporary emergency closure during a flood emergency at the direction of the Contracting Officer. Removal of all closure materials and debris after the flood emergency shall also be included and at the direction of the Contracting

Officer. Payment to complete the Emergency Closure shall be made at the Lump Sum price for Item No. 0008 " Emergency Closure Construction - Solomon Creek", of the Unit Price Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

## SECTION 01320

## PROJECT SCHEDULE

09/99

## PART 1 GENERAL

## 1.1 REFERENCE

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

## ENGINEERING REGULATIONS (ER)

ER 1-1-11 (1995) Progress, Schedules, and Network Analysis Systems

## 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-01 Preconstruction Submittals

Initial Project Schedule; G AR.

Shows sequence of activities for work through the entire project and shall be at a reasonable level of detail.

Preliminary Project Schedule; G AR.

Payment Purpose.

Periodic Schedule Updates; G AR.

These updates enables the Contracting Officer assess Contractor's progress.

Qualifications; G AR.

Documentation showing qualifications of personnel preparing schedule reports.

Narrative Report; G AR. Schedule Reports; G AR.

Three copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

## 1.3 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

### 3.1 GENERAL REQUIREMENTS

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

#### 3.1.1 Format

The Contractor shall submit his schedule on 3-1/2 inch disk or CD-ROM. The schedule files must be legible on an IBM PC/XT or compatible system, and utilize the Primavera scheduling program. This requirement is not intended to limit the Contractor to the use of only this program for his scheduling system. However, if the schedule files are provided in any other format for any other scheduling program, any and all of the other software needed to make the data files legible on the IBM PC/XT or compatible must also be provided, and shall remain available to the Government until fiscal completion of the contract. Additional disk submittals will only be required if there is a change in the schedule order or activity interdependence.

### 3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an approved schedule or scheduling personnel will result in an inability of the Contracting Officer to evaluate Contractor's progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

### 3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this

specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

#### 3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in the Precedence Diagram Method (PDM).

#### 3.3.2 Level of Detail Required

The Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule.

##### 3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations are greater than 20 days).

##### 3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, and delivery.

##### 3.3.2.3 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

##### 3.3.2.4 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

##### 3.3.2.5 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number. Whenever possible, changes shall be added to the schedule by adding new activities. Existing activities shall not normally be changed to reflect modifications.

#### 3.3.2.6 Phase of Work

All activities shall be identified in the project schedule by the phases of work in which the activity occurs. Activities shall not contain work in more than one phase of work. The project phase of each activity shall be by the unique Phase of Work Code.

#### 3.3.2.7 Category of Work

All Activities shall be identified in the project schedule according to the category of work which best describes the activity. Category of work refers, but is not limited, to the procurement chain of activities including such items as submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing. The category of work for each activity shall be identified by the Category of Work Code.

#### 3.3.2.8 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

#### 3.3.2.9 Specification Section

All activities shall be identified in the project schedule according to the specification section to which the activity belongs.

### 3.3.3 Scheduled Project Completion

The schedule interval shall extend from Notice-to-Proceed to the contract completion date.

#### 3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the Notice to Proceed (NTP) was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have: an "ES" constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

#### 3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract

completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity call "End Project". The "End Project" activity shall have: an "LF" constraint date equal to the completion date for the project, and a zero day duration.

#### 3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted in the narrative report at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period.

#### 3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

##### 3.3.4.1 Start Phase

The Contractor shall include as the first activity for a project phase an activity called "Start Phase X" where "X" refers to the phase of work. The "Start Phase X" activity shall have: an "ES" constraint date equal to the date on which NTP was acknowledged, and a zero day duration.

##### 3.3.4.2 End Phase

The Contractor shall include as the last activity in a project phase an activity called "End Phase X" where "X" refers to the phase of work. The "End Phase X" activity shall have: an "LF" constraint date equal to the completion date for the project, and a zero day duration.

##### 3.3.4.3 Phase X

The Contractor shall include a hammock type activity for each project phase called "Phase X" where "X" refers to the phase of work. The "Phase X" activity shall be logically tied to the earliest and latest activities in the phase.

#### 3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity and failure to ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the

Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. Updating of the percent complete and the remaining duration of any activity shall be independent functions. Program features which calculate one of these parameters from the other shall be disabled.

#### 3.3.6 Out-of-Sequence Progress

Activities that have posted progress without all preceding logic being satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contractor shall propose logic corrections to eliminate all out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule.

#### 3.3.7 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

### 3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

#### 3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 60 calendar days shall be submitted for approval within 20 calendar days after Notice to Proceed is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after Notice to Proceed.

#### 3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

#### 3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative, is necessary for verifying the contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

#### 3.4.4 Standard Activity Coding Dictionary

The Contractor shall use the activity coding structure defined in the Standard Data Exchange Format (SDEF) in ER 1-1-11, Appendix A. This exact structure is mandatory, even if some fields are not used.

### 3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the preliminary submission, and every periodic project schedule update throughout the life of the project:

#### 3.5.1 Data Disks

Two data disks containing the project schedule shall be provided. Data on the disks shall adhere to the SDEF format specified in ER 1-1-11, Appendix A.

##### 3.5.1.1 File Medium

Required data shall be submitted on 3.5 disks, formatted to hold 1.44 MB of data, under the MS-DOS Version 5. or 6.x, unless otherwise approved by the Contracting Officer.

##### 3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Preliminary, Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the MS-DOS version used to format the disk.

##### 3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

#### 3.5.2 Narrative Report

A Narrative Report shall be provided with the preliminary, initial, and each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the 2 most critical paths, a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. The narrative report is expected to relay to the Government, the Contractor's thorough analysis of the schedule output and its plans to compensate for any problems, either current or potential, which are revealed through that analysis.

#### 3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the

Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

#### 3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

##### 3.5.4.1 Activity Report

A list of all activities sorted according to activity number.

##### 3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number. Preceding and succeeding activities shall include all information listed above in paragraph Schedule Reports. A blank line shall be left between each activity grouping.

##### 3.5.4.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates. Completed activities shall not be shown on this report.

##### 3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost) and Earnings to Date.

#### 3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Contracting Officer

will use, but is not limited to, the following conditions to review compliance with this paragraph:

#### 3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity number, description, duration, and estimated earned value shall be shown on the diagram.

#### 3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

#### 3.5.5.3 Critical Path

The critical path shall be clearly shown.

#### 3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

#### 3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

### 3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

#### 3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

#### 3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

#### 3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of

the Contracting Officer. As a minimum, the Contractor shall address the following items on an activity by activity basis, during each progress meeting.

#### 3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed.

#### 3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

#### 3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

#### 3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

#### 3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary. 3) Changes required to correct a schedule which does not represent the actual plan prosecution and progress of the work.

### 3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, or any interim milestone date, the Contractor shall furnish the following for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract: justification, project schedule data, and supporting evidence as the Contracting Officer may deem necessary. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

#### 3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request.

The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

### 3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the Notice to Proceed or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

### 3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

### 3.8 DIRECTED CHANGES

If Notice to Proceed (NTP) is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor with suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the

Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

## SECTION 01330

SUBMITTAL PROCEDURES  
09/00

## PART 1 GENERAL

## 1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers and titles as follows:

- SD-01 Preconstruction Submittals
- SD-02 Shop Drawings
- SD-03 Product Data
- SD-04 Samples
- SD-05 Design Data
- SD-06 Test Reports
- SD-07 Certificates
- SD-10 Operation and Maintenance Data
- SD-11 Closeout Submittals

## 1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

## 1.2.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

## 1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above. Submittal Register ENG FORM 4288, column labeled "Reviewer", this column is blank and is understood that the reviewer is "AR" (Area Office).

## 1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as

a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

#### 1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

#### 1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

#### PART 2 PRODUCTS (Not used)

#### PART 3 EXECUTION

##### 3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

##### 3.2 SUBMITTAL REGISTER

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register files, containing the computerized ENG Form 4288 and instructions on the use of the files. These submittal register files will be furnished on a separate diskette. Columns "c" through "f" have been completed by the Government; the Contractor shall complete columns "a" and "g" through "i" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

### 3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

### 3.4 TRANSMITTAL FORM (ENG FORM 4025)

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

### 3.5 SUBMITTAL PROCEDURE

Six (6) copies of submittals shall be made as follows:

#### 3.5.1 Procedures

In the signature block provided on ENG Form 4025 the Contractor certifies that each item has been reviewed in detail and is correct and is in strict conformance with the contract drawings and specifications unless noted otherwise. The accuracy and completeness of submittals is the responsibility of the Contractor. Any costs due to resubmittal of documents caused by inaccuracy, lack of coordination, and/or checking shall be the responsibility of the Contractor. This shall include the handling and review time on the part of the Government. Each variation from the contract

specifications and drawings shall be noted on the form; and, attached to the form, the Contractor shall set forth, in writing, the reason for and description of such variations. If these requirements are not met, the submittal may be returned for corrective action.

### 3.5.2 Responsibility

The Contractor is responsible for the total management of his work. The quantities, adequacy and accuracy of information contained in the submittals are the responsibility of the Contractor. Approval actions taken by the Government will not in any way relieve the Contractor of his quality control requirements.

### 3.5.3 Additional Requirements

The above is in addition to the requirements set forth in Contract Clause entitled "Specifications and Drawings for Construction". (ER 415-1-10)

### 3.5.4 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

## 3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

## 3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four (4) copies of the submittal will be retained by the Contracting Officer and two (2) copies of the submittal will be returned to the Contractor.

## 3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

<p>CONTRACTOR</p> <p>(Firm Name)</p> <p>_____ Approved</p> <p>_____ Approved with corrections as noted on submittal data and/or attached sheets(s).</p> <p>SIGNATURE: _____</p> <p>TITLE: _____</p> <p>DATE: _____</p>
--

3.10 CERTIFICATES OF COMPLIANCE: (MAY 1969)

Any Certificate required for demonstrating proof of compliance of materials with specification requirements shall be executed in four (4) copies. Each certificate shall be signed by an official authorized to certify in behalf on the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements. (CENAB)

-- End of Section --

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR																
TRANSMISSION CATEGORY	ITEM SUBMITTED	DESCRIPTION	PARA #	CLASSIFICATION	GVT OR SCHEDULE DATES	CONTRACTOR ACTION	DATE FWD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE OF ACTION	APPROVING AUTHORITY		DATE RCD FRM APPR AUTH	REMARKS					
										SUBMIT BY	APPROVAL NEEDED			DATE FWD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE OF ACTION	DATE OF ACTION	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)	
	01000	SD-01 Preconstruction Submittals																
		Title Evidence																
		Invoice Copies																
		Payment Evidence																
		Photographs	1.11															
		SD-03 Product Data																
		Cost or Pricing Data	1.6															
		Equipment Data	1.7															
		SD-05 Design Data																
		Progress Schedule																
		SD-10 Operation and Maintenance																
		Data																
		O and M Data	1.8															
	01050	SD-01 Preconstruction Submittals																
		Shut Down Utility Services	1.4.2															
		Preconstruction Surveys																
		Construction Sequence Plan	1.7.4.2															
		Wall Protection and Monitoring Plan	1.7.4.2															
		Advance Notice	1.4.3															
		Checklist	1.4.4															
		Maintenance of Traffic Control Records	1.19.2															
		SD-05 Design Data	1.11															
		Traffic Control Plan:	1.9.1															
		Field Notes and Records																

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
A C T I O N	T R A N S M I T T A L	S P E C I F I C A T I O N	D E S C R I P T I O N	P A R A G R A P H	G O V E R N M E N T	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			M A I L E D T O C O N T R A C T I O N	D A T E R C D F R M A P P R	R E M A R K S		
						S U B M I T T E D	B Y	A C T I O N	D A T E	S U B M I T T E D	F R O M	R E V I E W E R				D A T E	O T H E R
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01050		Quantity Surveys														
			SD-06 Test Reports														
			Base Survey Report	1.7.4.3	G ED												
			Intermediate Monitoring Reports	1.7.4.3	G ED												
			Final Monitoring Report	1.7.4.2	G ED												
	01060		SD-01 Preconstruction Submittals														
			Safety Supervisor	1.3	G AR												
			SD-07 Certificates														
			Language Certification	1.3													
			SD-09 Manufacturer's Field Reports														
			Activity Phase Hazard Analysis	1.3	G AR												
			Plan														
			Outline Report														
			OSHA Log														
	01320		SD-01 Preconstruction Submittals														
			Initial Project Schedule		G AR												
			Preliminary Project Schedule		G AR												
			Periodic Schedule Updates		G AR												
			Qualifications	1.3	G AR												
			Narrative Report	3.5.2	G AR												
			Schedule Reports	3.5.4	G AR												
	01356		SD-07 Certificates														
			Mill Certificate or Affidavit														
	01451		SD-01 Preconstruction Submittals														
			CQC Plan	3.2	G AR												

# SUBMITTAL REGISTER

CONTRACT NO.  
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TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
A C T I O N	T R A N S M I T T A L	S P E C S E C T	D E S C R I P T I O N	P A R A G R A P H	G O V C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			M A I L E D T O C O N T R A C T O R / D A T E R C D F R M A P P R	R E M A R K S			
						S U B M I T	B Y	D A T E	F R O M	D A T E	F W D	T O			O T H E R	R E V I E W E R	D A T E
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	01451		Phase Notification Request		G AR												
			CQC Mgr Qualification		G AR												
			SD-05 Design Data														
			Notification of Changes	3.2.4													
			Punchlist	3.8.1													
			Minutes	3.3													
			SD-06 Test Reports														
			Tests	3.7.1													
			Documentation	3.9													
			Tests Performed	3.7.1													
			QC Records		G AR												
	01510		SD-01 Preconstruction Submittals														
			Emergency Action Plan	1.15	G AR												
			Emergency Action Plan	1.16	G AR												
			SD-02 Shop Drawings														
			Temporary Electrical Work		G AR												
			Haul and Access Routes	1.8.1	G AR												
			Site Plan	1.10	G AR												
			Temporary Fills and Embankments	1.9	G AR												
	01561		SD-05 Design Data														
			Facility Plan	1.9.4	G AR												
			Temporary Plan	1.9.5	G AR												
	01720		SD-11 Closeout Submittals														
			Progress Prints		G AR												

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION		CONTRACTOR																
WILKES-BARRE PHASE 2B		G O V T																
A C T I O N	T R A N S M I T T A L N O	S P E C I F I C A T I O N S	DESCRIPTION	P A R A G R A P H	C L A S S I F I C A T I O N	G O V T	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			REMARKS				
							SUBMIT BY	(g)	APPROVAL NEEDED	BY	(h)	DATE OF ACTION	(k)		DATE FWD TO APPR AUTH/	DATE RCD TO OTHER FROM	DATE FWD TO APPR AUTH/	DATE RCD TO OTHER FROM
(a)	(b)	(c)	(d)	(e)	(f)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01720		Final Requirements	1.6	G AR													
			CADD Files, CALS Files and Paper Prints															
	02220		SD-03 Product Data															
			Work Plan															
	02316a		SD-06 Test Reports															
			Field Density Tests	3.4.3														
			Testing of Backfill Materials	3.4.2	G ED													
	02329		SD-01 Preconstruction Submittals															
			Stripping Sequence Plan	3.2	G AR													
			Disposal of Materials	3.6														
			SD-05 Design Data															
			Dewatering Plan	3.4.2	G AR													
			Shoring	3.5	G AR													
	02331		SD-01 Preconstruction Submittals															
			Borrow Excavation Permits	1.4.3														
			SD-03 Product Data															
			Compaction Equipment	3.6.1	G ED													
			SD-04 Samples															
			Samples of Materials	1.4.3	G ED													
			SD-06 Test Reports															
			Materials	3.7.1	G ED													
			Daily Laboratory Test Results	3.7.1														
			Bi-weekly Summary Report	3.7.1														
			Final Embankment QC Testing Report	3.7.1														

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
TRANSMISSION CATEGORY	ITEM SUBMITTED	DESCRIPTION	P A R A G R A P H	G O V T C L A S S I F I C A T I O N R	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			MAILED TO CONTR/ DATE RCD FRM APPR	REMARKS				
					SUBMIT BY (g)	APPROVAL NEEDED (h)	MATERIAL NEEDED (i)	DATE OF ACTION (j)	DATE FWD TO APPR AUTH/ (k)	DATE RCD TO OTHER FROM REVIEWER (l)	DATE FWD TO OTHER FROM OTH REVIEWER (m)			DATE OF ACTION (n)	DATE OF ACTION (p)		
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	02331		Rockfill Gradation Testing	3.7.6	G ED												
			SD-07 Certificates														
	02456		Materials and Test Results	3.7.1	G ED												
			SD-01 Preconstruction Submittals														
			Qualifications		G ED												
			SD-02 Shop Drawings														
			Fabricated Additions		G ED												
			SD-03 Product Data														
			Equipment	2.2	G ED												
			SD-05 Design Data														
			Wave Equation Analysis		G ED												
			SD-06 Test Reports														
			Surveys and Records		G ED												
			Pile Driving Records		G ED												
			SD-07 Certificates														
			Materials	2.1	G ED												
	02457N		SD-02 Shop Drawings														
			Steel sheet piles	2.1	G G												
			SD-07 Certificates														
			Pile pulling method	3.3.2	G AR												
			Material certificates	1.4.1	G AR												
			Pile driving equipment	1.5.1	G AR												
			Certified Vibration Report		G AR												
			SD-09 Manufacturer's Field Reports														
			Pre-installation Survey Report														

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
A C T I O N	T R A N S M I T T A L N O	S P E C I F I C A T I O N S E C T	D E S C R I P T I O N	P A R A G R A P H	G L A S S I F I C A T I O N	G O V	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			M A I L E D T O C O N T R /	D A T E R C D F R M A P P R	R E M A R K S	
							S U B M I T	B Y	A P P R O V A L N E E D E D	M A T E R I A L N E E D E D	D A T E O F A C T I O N	D A T E F W D T O A P P R A U T H /	D A T E R C D F R O M C O N T R A U T H /				D A T E F W D T O O T H E R R E V I E W E R
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	02457N		SD-11 Closeout Submittals														
			Pile driving record	3.4													
			Post-installation Survey Report														
	02548		SD-05 Design Data														
			Asphalt Mix Design														
			SD-06 Test Reports														
			Density Testing														
			Plant Control														
			SD-07 Certificates														
			Prime Coat														
			Tack Coat														
	02620		SD-04 Samples														
			Geotextile	2.2													
			Pipe and Fittings for Subdrains	2.1													
			SD-07 Certificates														
			Geotextile	2.2													
			Pipe and Fittings for Subdrains	2.1													
	02630a		SD-03 Product Data														
			Placing Pipe	3.3													
			SD-04 Samples														
			Pipe for Culverts and Storm	2.1													
			Drains														
			SD-07 Certificates														
			Resin Certification	2.1.2													
			Frame and Cover for Gratings	2.3.6													
	02770		SD-05 Design Data														

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
A C T I O N	T R A N S M I T T A L N O	S P E C S E C T	DESCRIPTION	ITEM-SUBMITTED	(d)	(e)	(f)	CONTRACTOR SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			DATE RCD FRM APPR AUTH	REMARKS	
								DATE FWD TO APPR AUTH/	DATE RCD TO OTHER FROM CONTR REVIEWER	DATE OF ACTION	DATE OF ACTION	DATE FWD TO OTHER FROM REVIEWER	DATE RCD FROM OTH	DATE OF ACTION			DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	02770		Concrete			2.1	G ED										
			SD-06 Test Reports														
			Field Quality Control			3.6											
	02921a		SD-03 Product Data														
			Equipment														
			Surface Erosion Control Material			2.6											
			Chemical Treatment Material			1.4.3											
			Delivery			1.4.1											
			Finished Grade and Topsoil			3.2.1											
			Topsoil			2.2											
			Quantity Check			3.5											
			Seed Establishment Period			3.8											
			Maintenance Record			3.8.3.4											
			SD-04 Samples														
			Delivered Topsoil			1.4.1.1	G AR										
			SD-06 Test Reports														
			Equipment Calibration			3.1.3											
			Soil Test			3.1.4											
			SD-07 Certificates														
			Seed			2.1	G AR										
			Topsoil			2.2	G AR										
			pH Adjuster			2.3.1	G AR										
			Fertilizer			2.3.2	G AR										
			Organic Material			2.3.4	G AR										
			Soil Conditioner			2.3.5	G AR										
			Mulch			2.4	G AR										

# SUBMITTAL REGISTER

CONTRACT NO.  
DACW31-03-R-000

TITLE AND LOCATION WILKES-BARRE PHASE 2B		CONTRACTOR															
A C T I O N	T R A N S M I T T A L	S P E C S E C T	DESCRIPTION	P A R A G R A P H	G O V C L A S S I F I C A T I O N	CONTRACTOR: SCHEDULE DATES		CONTRACTOR ACTION		APPROVING AUTHORITY			M A I L E D T O C O N T R I B U T I O N	D A T E R C D F R M A P P R	R E M A R K S		
						S U B M I T B Y	S U B M I T D A T E	A P P R O V I N G A U T H	D A T E O F A C T I O N	D A T E F R O M C O N T R I B U T I O N	D A T E F O R W A R D T O O T H E R R E V I E W E R	R E V I E W E R				D A T E O F A C T I O N	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	03100a		SD-02 Shop Drawings														
			Formwork	3.1.1													
			SD-03 Product Data														
			Design	1.3													
			Form Materials	2.1													
			Form Releasing Agents	2.1.4													
	03151a		SD-03 Product Data														
			Splicing Waterstops	2.2.2	G AR												
			SD-04 Samples														
			Field Molded Sealants and	2.1.2.1													
			Primer														
			Waterstops	2.1.3													
			SD-06 Test Reports														
			Premolded Expansion Joint Filler	2.1.1													
			Strips														
	03201		SD-02 Shop Drawings														
			Fabrication and Placement	3.1	G ED												
			SD-03 Product Data														
			Butt-Splices	3.1.4.2	G ED												
			Materials	2.1	G AR												
			SD-04 Samples														
			Epoxy-Coated Bars	2.1.1.1													
			SD-06 Test Reports														
			Material	2.2	G AR												
			Tests, Inspections, and	2.2	G AR												
			Verifications														

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TITLE AND LOCATION		CONTRACTOR															
WILKES-BARRE PHASE 2B		G O V E R N M E N T															
A C T I O N	T R A N S M I T T A L N O	DESCRIPTION	ITEM-SUBMITTED	P A R A G R A P H	C L A S S I F I C A T I O N	CONTRACTOR SCHEDULE DATES	CONTRACTOR ACTION	APPROVING AUTHORITY			REMARKS						
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	03201	SD-07 Certificates															
		Epoxy-Coated Steel Bars		2.1.1.1													
		Qualification of Steel Bar		2.2.2													
		Butt-Splicers															
	03300	SD-04 Samples		2.3.5													
		Surface Retarder															
		SD-05 Design Data															
		Mixture Proportions		1.8	GED												
		Cold Weather Requirements		3.6.3	GED												
		Hot Weather Requirements		3.6.4	GED												
		Willow Street Relief Culvert			GED												
		SD-06 Test Reports															
		Testing and Inspection for		3.13	GED												
		Contractor Quality Control															
		SD-07 Certificates															
		Quality Control Qualifications		1.4													
	05055a	SD-02 Shop Drawings															
		Detail Drawings		1.3	GED												
		SD-03 Product Data															
		Welding of Structural Steel		2.2.2.1	GED												
		Welding of Aluminum		2.2.2.2	GED												
		Structural Steel Welding Repairs		2.3.4	GED												
		Materials Orders		2.1.1													
		Materials List		2.1.2	GED												
		Shipping Bill		2.1.3													
		SD-06 Test Reports															

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						S U B M I T B Y	S U B M I T D A T E	D A T E O F A C T I O N	D A T E O F A C T I O N	D A T E F R O M R E V I E W E R	D A T E F R O M O T H E R R E V I E W E R	D A T E O F A C T I O N		D A T E R C D F R O M A P P R O V I N G A U T H			
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	05055a		Tests, Inspections, and Verifications	2.3													
			Qualification of Welders and Welding Operators	1.4													
			Application Qualification for Steel Stud	2.2.2.3													
			Welding of Aluminum	2.2.2.2													
	05502a		Shop Fabricated Metal Items	2.2	G ED												
			Miscellaneous Metals and Standard Metal Articles	2.1	G AR												
			Shop Fabricated Metal Items	2.2	G AR												
			SD-06 Test Reports	2.1	G ED												
			Miscellaneous Metals and Standard Metal Articles	2.2	G ED												
	13123		Shop Fabricated Metal Items	2.2	G ED												
			SD-02 Shop Drawings		G ED												
			Drawings		G ED												
			SD-03 Product Data		G ED												
			Split-Faced Block		G ED												
			Precast Prestressed Concrete		G ED												
			Roof Plank		G ED												
			Architectural Features		G ED												
			Miscellaneous Items	2.10	G ED												





## INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288 for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

### THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

- |      |  |       |   |
|------|--|-------|---|
| A -- | Approved as submitted.   | E --  | Disapproved (See attached).   |
| B -- | Approved, except as noted on drawings.   | F --  | Receipt acknowledged.   |
| C -- | Approved, except as noted on drawings.<br>Refer to attached sheet resubmission required. | FX -- | Receipt acknowledged, does not comply<br>as noted with contract requirements. |
| D -- | Will be returned by separate correspondence.   | G --  | Other (Specify)   |

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

## SECTION 01356

STORM WATER POLLUTION PREVENTION MEASURES  
08/96

## 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 D 4439	(1997) Standard Terminology for Geosynthetics
ASTM D 4491	(1996) Water Permeability of Geotextiles by Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996)) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1995) Determining Apparent Opening Size of a Geotextile
ASTM D 4873	(1995) Identification, Storage, and Handling of Geosynthetic Rolls

## 1.2 GENERAL

The Contractor shall implement the storm water pollution prevention measures specified in this section in a manner which will meet the requirements of Section 01561 ENVIRONMENTAL PROTECTION, and the requirements of the National Pollution Discharge Elimination System (NPDES) permit attached to that Section.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Certificates

Mill Certificate or Affidavit

Certificate attesting that the Contractor has met all specified requirements.

#### 1.4 EROSION AND SEDIMENT CONTROLS

The controls and measures required by the Contractor are described below.

##### 1.4.1 Stabilization Practices

The stabilization practices to be implemented shall include temporary seeding, mulching, geotextiles, erosion control matts, protection of trees, preservation of mature vegetation, etc. On his daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except as provided in paragraphs UNSUITABLE CONDITIONS and NO ACTIVITY FOR LESS THAN 21 DAYS, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

##### 1.4.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

##### 1.4.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased.

##### 1.4.2 Structural Practices

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices. Location and details of installation and construction are shown on the drawings.

##### 1.4.2.1 Silt Fences

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading).

Silt fences shall be installed in the locations indicated on the drawings. Final removal of silt fence barriers shall be upon approval by the Contracting Officer.

1.4.2.2 Rock Construction Entrance

The Contractor shall provide rock construction entrances at all points of entry to the construction site. Rock construction entrances shall be placed prior to all other construction activities on site

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCES

2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE

PHYSICAL PROPERTY	TEST PROCEDURE	STRENGTH REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (%)		30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permissivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Stakes and Posts

The Contractor may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction, shall have a minimum cross section of 2 inches by 2 inches and shall have a minimum length of 3' for 18" fence and 4' for 30" fence. Steel posts (standard "U" or "T" section) utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3' for 18" fence and 4' for 30" fence.

2.1.3 Rock Construction Entrances

Rock construction entrances shall be constructed to the minimum width,

length and thickness dimensions shown on the plan drawings. Rock shall be AASHTO No. 1 as specified in PennDOT Specifications, Publication 408, Section 703.2. For installation in clay or poorly drained soils, a geotextile fabric underlayment, of a type recommended for such applications by the manufacturer, shall be used.

#### 2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

### PART 3 EXECUTION

#### 3.1 INSTALLATION OF SILT FENCES

Silt fences shall extend a minimum of 18 inches above the ground surface and shall not exceed 30 inches above the ground surface. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with overlap as shown on plans, and securely sealed. A trench shall be excavated approximately 6 inches wide and 6 inches deep on the upslope side of the location of the silt fence. The 6-inch by 6-inch trench shall be backfilled and the soil compacted over the filter fabric. Silt fences shall be removed upon approval by the Contracting Officer.

#### 3.2 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

##### 3.2.1 Silt Fence Maintenance

Silt fences shall be inspected in accordance with paragraph INSPECTIONS. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-half of the height of the barrier. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02921 SEEDING, except that the coverage requirements in paragraph SEED ESTABLISHMENT PERIOD do not apply.

##### 3.2.2 Rock Construction Entrance

The structure's thickness shall be maintained to the specified dimensions

by adding rock. A stockpile of rock material shall be maintained on site for this purpose. All sediment deposited on public roadways shall be removed immediately and returned to the construction site. Washing of roadway with water is not permitted.

### 3.3 INSPECTIONS

#### 3.3.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site daily.. Where sites have been finally stabilized, such inspection shall be conducted at least once every 7 calendar days.

#### 3.3.2 Inspections Details

Disturbed areas and areas used for material storage that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the Storm Water Pollution Prevention Plan shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

#### 3.3.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the Storm Water Pollution Prevention Plan, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall be maintained on the job site.

-- End of Section --

## SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS  
02/02

## PART 1 GENERAL

## 1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B 564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

## 1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number. The designations "AOK" and "LOK" are for administrative purposes and should not be used when ordering publications.

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Ph: 202-720-2791  
Fax: 202-720-2166  
Internet: <http://www.usda.gov>  
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U.S. DEPARTMENT OF COMMERCE (DOC)

Order Publications From:  
National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
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Internet: <http://www.ntis.gov>

AOK 5/01  
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## WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

Yeon Bldg.  
522 SW 5th Ave.  
Suite 500  
Portland, OR 97204-2122  
Ph: 503-224-3930  
Fax: 503-224-3934  
Internet: <http://www.wwpa.org>  
e-mail: [info@wwpa.org](mailto:info@wwpa.org)

AOK 5/01  
LOK 6/00

## WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

1400 East Touhy Ave., Suite 470  
Des Plaines, IL 60018  
Ph: 847-299-5200 or 800-223-2301  
Fax: 708-299-1286  
Internet: <http://www.wdma.com>  
e-mail: [admin@wdma.com](mailto:admin@wdma.com)

AOK 5/01  
LOK 6/00

## WOOD MOULDING AND MILLWORK PRODUCERS ASSOCIATION (WMMPA)

507 First Street  
Woodland, CA 95695  
Ph: 916-661-9591  
Fax: 916-661-9586  
Internet: <http://www.wmmpa.com>

AOK 5/01  
LOK 6/00

-- End of Section --

## SECTION 01451

CONTRACTOR QUALITY CONTROL  
03/01

## 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 D 3740 (1999b) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1998a) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

## 1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

CQC Plan; G AR.

Identifies personnel, procedures, control, instructions, test, records, and forms to be used.

Phase Notification

The Government shall be notified in a specified amount of time in advance of beginning the preparatory control phase.

Request; G AR.

The requesting of specialized individuals in specific disciplines to perform quality control.

CQC Mgr Qualification; G AR.

The evaluation of the project to determine the level of CQC System Manager required.

SD-05 Design Data

Notification of Changes

Any changes made by the Contractor.

Punchlist

Near the completion of all work, the CQC System Manager shall prepare a list of items which do not conform to the approved drawings and specifications.

Minutes

Prepared by the Government and signed by both the Contractor and the Contracting Officer and shall become a part of the contract file.

SD-06 Test Reports

Tests

Specified or required tests shall be done by the Contractor to verify that control measures are adequate.

Documentation

Results of tests taken.

Tests Performed

An information copy provided directly to the Contracting Officer.

QC Records; G AR.

Provide factual evidence that required quality control activities and/or tests have been performed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the

Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

### 3.2 CQC PLAN

#### 3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 60 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

#### 3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of

direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. The Contractor shall include a copy of his proposed laboratory's latest Corps of Engineers inspection report in the Quality Control Plan. The inspection report details the tests that the lab has been validated to perform under Corps of Engineers contracts. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

### 3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

### 3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

### 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting.

During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

### 3.4 QUALITY CONTROL ORGANIZATION

#### 3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

#### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 10 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be

identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

#### 3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil, and structural. These individuals shall be directly employed by the prime Contractor and may not be employed by a supplier or sub-contractor on this project; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan, with the exception of the Pile Driver Foreman/Crew Chief. The Pile Driver Foreman/Crew Chief shall have no other duties other than quality control.

#### Experience Matrix

<u>Area</u>	<u>Qualifications</u>
a. Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience
b. Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience
c. Pile Driver Foreman/ Crew Chief	Foreman/Crew Chief shall have a minimum of 7 years of experience driving similar sections and lengths of piling to the specified tolerances.

#### 3.4.4 Additional Requirement

In addition to the above experience and/or education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors" within 45 calendar days after NTP is a mandatory requirement for the position of the Quality Control Systems Manager. Certification is good for five (5) years at which time re-training is required. The Contractor's QC Systems Manager may be appointed and serve fully in that capacity pending certification. If the CQC Systems Manager fails to successfully complete the training, the

Contractor should promptly appoint a new CQSM who shall then attend the next available course. The course is nine (9) hours long (1 day). The Construction Quality Management Course (CQMC) will be taught at least nine (9) times per year by the Baltimore District Corps of Engineers, at various locations around Baltimore and Washington, D.C., or at another site if conditions warrant. The CQMC cost will be borne by the Contractor and is one hundred and thirty five dollars (\$135.00) per course, per person. Payment shall be made by check payable to either sponsors of the course; Associated Builders and Contractors, Inc., (ABC) 14120 Park Long Court, Suite 111, Chantilly, Virginia 20151 (Phone: 703-968-6205), or to the Associated General Contractors of America (GCA), Maryland Chapter, 1301 York Road, Heaver Plaza, Suite 202, Lutherville, Maryland 21093 (Phone: 410-321-7870) prior to the start of the course. Reservations to attend the course should be made directly to the organization sponsoring the course they attend. The Contractor has forty-five (45) calendar days to attend the course after the issuance of the NTP. The Contractor shall contact the Contracting Officer upon award of the contract arrangements for the course.

#### 3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

#### 3.5 SUBMITTALS

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

#### 3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

##### 3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government

personnel until final acceptance of the work.

- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 72 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

### 3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample

panels as appropriate.

- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 72 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

### 3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

## 3.7 TESTS

### 3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and

comply with testing standards.

- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

#### 3.7.2.2 Laboratory Approval

The Contractor shall use a Corps of Engineers approved testing laboratory or obtain approval for a laboratory at the project site. If the Contractor elects to set up an on-site laboratory, the Contractor will be assessed \$4,500.00 for the cost for inspection of this lab by the Corps of Engineers."

#### 3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

#### 3.7.4 Furnishing or Transportation of Samples for Testing

Furnishing or Transportation of Samples for Testing: Costs incidental to the transportation of samples or materials will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the following address:

Field Exploration Unit

or  
Soils Laboratory Unit  
(indicate which on shipping or mailing forms)  
Fort McHenry Yard  
Baltimore, Maryland 21230"

### 3.8 COMPLETION INSPECTION

#### 3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause in Section 00800 of the Solicitation entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a punchlist of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

#### 3.8.2 Pre-Final Inspection

The Government will perform pre-final inspection to verify that the facility is complete and ready to be occupied. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment of the work if the project is divided into increments by separate completion dates.

#### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be

cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

### 3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase shall be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals and deliverables reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of

the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

### 3.10 SAMPLE FORMS

Sample forms enclosed at the end of this section.

### 3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

Contractor's Name:	_____
Address:	_____ _____
Phone Number:	_____

CONSTRUCTION QUALITY CONTROL REPORT

PROJECT NAME: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CONTRACT NUMBER: \_\_\_\_\_ REPORT NO.: \_\_\_\_\_

SUPERINTENDENT: _____			
TYPE OF WORKERS	NUMBER	TYPES OF CONSTRUCTION EQUIPMENT ON SITE	NUMBER
SUBCONTRACTORS			
COMPANY	RESPONSIBILITY	FOREMAN	NO. OF WORKERS
TOTALS			
NO. OF WORKERS TODAY	MANHOURS TODAY	MANHOURS FOR THIS PERIOD	
CONTRACT MATERIALS AND EQUIPMENT DELIVERED TO SITE:			
WEATHER: _____		SITE CONDITIONS: _____	
DID A DELAY OR WORK STOPPAGE OCCUR TODAY? _____ IF YES, EXPLAIN.			
HAS ANYTHING DEVELOPED IN THE WORK WHICH MAY LEAD TO A CHANGE OR FINDING OF FACT? _____ IF YES, EXPLAIN.			

DESCRIPTION OF ALL WORK PERFORMED TODAY  
(LIST BY DEFINABLE FEATURES OF WORK)

PREPARATORY INSPECTION:

LIST ALL INSPECTIONS BY SUBJECT AND SPECIFICATION LOCATION.  
ATTACH MINUTES OF MEETING AND LIST OF ALL ATTENDEES.

HAVE ALL REQUIRED SUBMITTALS AND SAMPLES OF CONSTRUCTION BEEN  
APPROVED.

DO THE MATERIALS AND EQUIPMENT TO BE USED CONFORM TO THE SUBMITTALS?

HAS ALL PRELIMINARY WORK BEEN INSPECTED, TESTED, AND COMPLETED?

TEST REQUIRED AND INSPECTION TECHNIQUES TO BE EXECUTED TO PROVE  
CONTRACT COMPLIANCE (INCLUDE BOTH EXPECTED AND ACTUAL RESULTS)

HAS A PHASE HAZARD ANALYSIS BEEN PERFORMED?

COMMENTS AND DEFICIENCIES NOTED AND CORRECTIVE ACTIONS TAKEN:

ALL INSTRUCTIONS RECEIVED FROM QA PERSONNEL AND ACTIONS TAKEN:

JOB SAFETY (INCLUDE MEETINGS HELD AND DEFICIENCIES NOTED WITH CORRECTIVE ACTIONS):

INITIAL INSPECTION:

LIST ALL INSPECTIONS BY SUBJECT AND SPECIFICATION LOCATION.  
COMMENTS AND/OR DEFICIENCIES NOTED AND CORRECTIVE ACTION TAKEN:

FOLLOW-UP INSPECTION:

LIST ALL INSPECTIONS BY SUBJECT AND SPECIFICATION LOCATION.  
COMMENTS AND/OR DEFICIENCIES NOTED AND CORRECTIVE ACTION TAKEN.

SIGNATURE: \_\_\_\_\_  
QUALITY CONTROL REPRESENTATIVE/MANAGER

THE ABOVE REPORT IS COMPLETE AND CORRECT. ALL MATERIALS AND EQUIPMENT USED AND ALL WORK PERFORMED DURING THIS REPORTING PERIOD ARE IN COMPLIANCE WITH THE CONTRACT SPECIFICATIONS, AND SUBMITTALS, EXCEPT AS NOTED ABOVE.

SIGNATURE: \_\_\_\_\_  
CONTRACTOR'S APPROVED AUTHORIZED REPRESENTATIVE

## SECTION 01510

TEMPORARY CONSTRUCTION ITEMS  
01/01

## 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.

## U.S. ARMY CORPS OF ENGINEERS

EP 310-1-6

U.S. Army Corps of Engineers Sign  
Standards Manual

## 1.2 General

The work covered by this section consists of furnishing all labor, materials, equipment, and services and performing all work required for or incidental to the items herein specified. No separate payment will be made for the construction and services required by this section, and all costs in connection therewith shall be included in the overall cost of the work unless specifically stated otherwise.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Emergency Action Plan; G AR.

Emergency action plans for the Courthouse and Solomon Creek Temporary  
Closures

## SD-02 Shop Drawings

Temporary Electrical Work; G AR.

The Contractor shall submit a temporary power distribution sketch prior to the installation of any temporary power.

Haul and Access Routes; G AR.

Drawings and narrative showing routes to the site.

Site Plan; G AR.

Site plan showing the Contractor's fenced areas as specified in this section

Temporary Fills and Embankments; G AR.

Drawings showing the proposed fills and embankments

#### 1.4 PROJECT SIGN: (AUG 1974)

A project sign shall be provided and erected at a location designated by the Contracting Officer. The sign shall conform to the applicable requirements of EP 310-1-6 (this Engineering Pamphlet is available at <http://www.hnd.usace.army.mil/techinfo/index.htm>). The sign shall be erected as soon as possible and within 15 days after the date of receipt of notice to proceed. Upon completion of the project, the sign shall be removed and disposed of by the Contractor. (CENAB)

#### 1.5 SAFETY SIGN (JUN 1994)

A safety sign shall be provided and erected at a location designated by the Contracting Officer. The sign shall conform to the applicable requirements of EP 310-1-6. The sign shall be erected as soon as possible and within 15 days after the date of receipt of notice to proceed. (CENAB)

#### 1.6 CONTRACTOR-PROVIDED SOFTWARE

##### 1.6.1 General

The Contractor shall provide the Government office with the following software (to include all original diskettes, licenses and manuals) for the sole use of the Contracting Officer's Representative (COR).

- a) SureTrak Project Planner for Windows version 2.0 or newer, or any other scheduling software used by the Contractor.
- b) CADD program 100% compatible with the AutoCADD 2002 file format.

##### 1.6.2 Installation and Maintenance

The software shall be installed and operational within 20 days of Contract Notice to Proceed and shall be maintained in operational condition by the Contractor until final payment has been made to the Contractor.

##### 1.6.3 Training

The Contractor shall provide a minimum of 8 hours training for three (3) individuals on the use of the network analysis system software.

##### 1.6.4 Disposition of Workstation Equipment and Software

At the end of the contract, the network analysis software shall be returned to the Contractor, and in no event become the property of the U.S. Army Corps of Engineers.

#### 1.7 TEMPORARY PAVING PATCH

The Contractor shall place a temporary patch of cold mixed asphalt of adequate size and thickness immediately after utility trenches or other road or paved area openings are backfilled and compacted as specified in Division 02 of the specifications. The temporary patch shall be maintained by the Contractor until he permanently repairs the opening as delineated in Division 02.

#### 1.8 HAUL AND ACCESS ROUTES

##### 1.8.1 Access Route Narrative, Survey and Post Construction Restoration

After award of the contract, the Contractor shall submit to the Contracting Officer for approval, a narrative with drawings of the through town haul and access routes intended for use. Unless otherwise directed by the Contracting Officer, only roads in the approved narrative may be used for hauling purposes. Upon approval of the haul and access routes, the Contractor and the Contracting Officer shall jointly survey the existing road conditions. Photo coverage of designated locations along the proposed route may be required as specified in Section 01000 ADMINISTRATIVE REQUIREMENTS. Upon completion of the work, any street or city road used as a haul or access route shall be restored and/or rebuilt to the original condition. This work shall be subject to the approval of the Contracting officer at no additional cost to the Government.

##### 1.8.2 Haul Road Construction

The Contractor shall, at his expense, construct such access roads and haul roads as may be necessary for proper prosecution of the work under this contract. Approved haul roads on public or private property shall be constructed in a workmanlike manner with suitable grades and widths. Sharp curves, blind corners, and dangerous cross traffic shall be avoided.

The Contractor shall provide all necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control although optional shall be adequate to insure safe operation at all times. Location, grade, width, and alignment of construction and roads shall be subject to approval of the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul and work areas during any night work operations. Upon completion of the work, constructed haul and access routes as designated by the Contracting Officer shall be removed at the expense of the Contractor. (CENAB)

#### 1.9 TEMPORARY FILLS AND EMBANKMENTS

Depending on the operations and equipment selected by the Contractor to perform the work in accordance with the specifications and drawings, temporary fills and embankments may be required. The contractor shall, at his expense, construct such fills and embankments as may be necessary for proper prosecution of work under this contract. All temporary fills and embankments shall be designed by the Contractor and shall be submitted to the Contracting Officer for review and approval. The Contractor shall be responsible for the design and all impacts to adjacent areas and structures from these temporary embankments and fills, which shall be maintained in good condition throughout their use. Upon completion of work, temporary embankments and fills shall be removed and the area restored to the original grades or finished grades as shown on the drawings at the expense of the Contractor.

#### 1.10 SITE PLAN

The Contractor shall prepare a site plan showing fencing, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. See subparagraph "Supplemental Storage Area" below. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

#### 1.11 PLANT COMMUNICATION (JAN 63)

Whenever the Contractor has the individual elements of his plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The facilities shall be made available for use by Government personnel. (CENAB)

#### 1.12 BARRICADES

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazardous areas during both day and night. (CENAB)

#### 1.13 EMPLOYEE PARKING

Contractor employees shall park privately owned vehicles in the areas designated by the Contracting Officer. Designated sites are adjacent to the construction site or within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of local residents and businesses.

#### 1.14 CONTRACTOR'S TEMPORARY FACILITIES

#### 1.14.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities near the construction site at an area designated by the Contracting Officer. Local government office and warehouse facilities will not be available to the Contractor's personnel.

#### 1.14.2 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will be rejected as unacceptable and the Contractor will be directed to provide new trailers or maintain existing ones.

#### 1.14.3 Maintenance of Storage Area

Should the Contractor elect to traverse, with construction equipment or other vehicles, grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

#### 1.14.4 Security Provisions

The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office. If local personnel are not available to provide security checks, the Contractor may utilize private security personnel approved by the Contracting Officer.

#### 1.14.5 Restoration of Storage Areas

Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

#### 1.14.6 Restoration of Unpaved Parking Areas

Any unpaved areas used for parking shall be repaired as directed by the Contracting Officer at no additional expense to the Government.

#### 1.15 EMERGENCY CONSTRUCTION OF COURTHOUSE TEMPORARY CLOSURE

- a) The Contractor shall submit an Emergency Action Plan for the installation of the stop logs at the Courthouse temporary closure during a flood event. This plan shall be submitted for review 45

days after NTP. The plan shall be approved by the contracting officer. The plan shall describe the methods and the approximate time required to install the stop logs, EPDM sheeting, and the backfill adjacent to the closure. The plan shall also include the source for the backfill material and the distance from the project site. Test installation of the Courthouse temporary closure will not be required.

b) The Contracting Officer will provide the contractor 24 hours notice that the option for the emergency closure construction may be exercised. The contractor will be required to completely install the structure within 12 hours from receiving the notice to proceed with the work (option) from the Contracting Officer.

c) Upon receiving the notice to proceed, the contractor shall first install the aluminum stop logs and then install the EPDM sheeting over the stop log extending the sheet approximately 5 feet beyond the riverside face. Sandbags shall be placed end to end around the front edge of the EPDM sheeting and at the base of the sill in order to hold the sheeting in place. Next the backfill material shall be placed against the structure."

d) The aluminum stop logs and the EPDM sheeting shall be Government furnished. All equipment, backfill material, and sand bags shall be furnished by the Contractor."

#### 1.16 EMERGENCY CONSTRUCTION OF SOLOMON CREEK TEMPORARY CLOSURE

a) The Contractor shall submit an Emergency Action Plan for the installation of the temporary closure during a flood event at the Solomon Creek closure structure. This plan shall be submitted for review 60 days prior to any construction work on the existing closure. The plan shall be approved by the contracting officer. The plan shall describe the type of structure proposed for the temporary closure, the methods and equipment to be used, and the approximate time required to construct the closure. Design calculations shall also be included in the plan. The designed for the temporary structure shall assume a water (river) level on the temporary structure at elevation 548. The contractor shall perform a test installation of the temporary closure to ensure that the entire structure can be properly installed in a timely fashion. However any proposed backfilling and sandbagging on the structure will not be necessary for the test installation.

b) The Contracting Officer will provide the contractor 24 hours notice to construct the emergency closure. The contractor will be required to completely install the structure within 12 hours from receiving the notice to proceed with the work from the Contracting Officer.

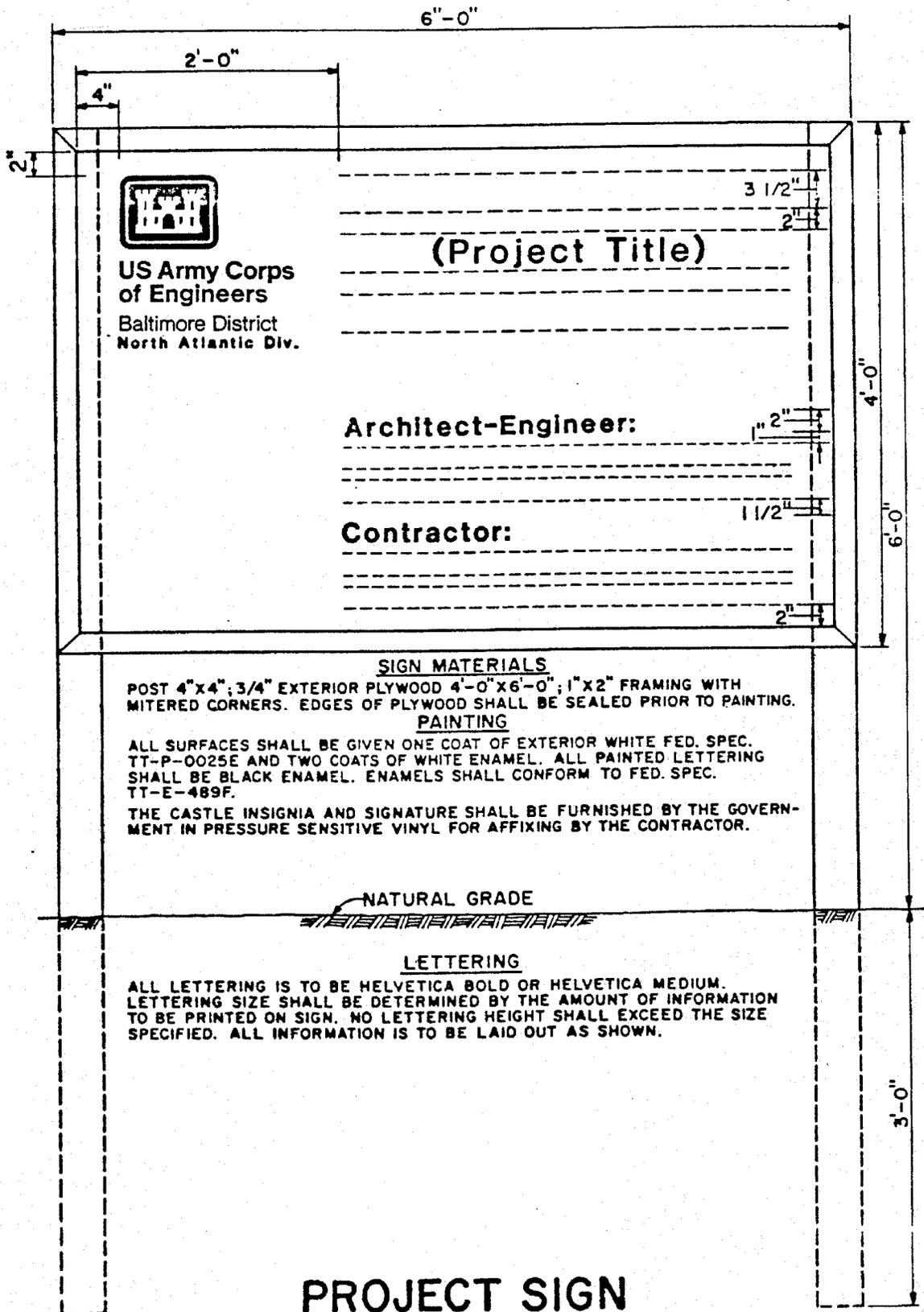
c) Prior to the start of any construction and modification to the existing closure structure, all materials and equipment that will be needed to construct the temporary emergency closure shall be stored on site at the staging area. Upon completion of all work and after the test installation of the new/modified Solomon Creek closure, the materials and equipment for the temporary closure can be removed from the work site.

d) All materials and equipment to construct the temporary emergency closure at Solomon Creek shall be furnished by the Contractor."

#### 1.17 MEASUREMENT AND PAYMENT

No separate measurement and payment, except as noted below, will be made for the work performed in this Section 01510, TEMPORARY CONSTRUCTION ITEMS, specified herein, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor, and shall be included in the overall cost of the work. All work for the emergency construction of the Courthouse and Solomon temporary closures shall be paid for as specified in Section 01270.

-- End of Section --



**US Army Corps  
of Engineers**  
Baltimore District  
North Atlantic Div.

(Project Title)

Architect-Engineer:

Contractor:

**SIGN MATERIALS**

POST 4"x4"; 3/4" EXTERIOR PLYWOOD 4'-0"x6'-0"; 1"x2" FRAMING WITH MITERED CORNERS. EDGES OF PLYWOOD SHALL BE SEALED PRIOR TO PAINTING.

**PAINTING**

ALL SURFACES SHALL BE GIVEN ONE COAT OF EXTERIOR WHITE FED. SPEC. TT-P-0025E AND TWO COATS OF WHITE ENAMEL. ALL PAINTED LETTERING SHALL BE BLACK ENAMEL. ENAMELS SHALL CONFORM TO FED. SPEC. TT-E-489F.

THE CASTLE INSIGNIA AND SIGNATURE SHALL BE FURNISHED BY THE GOVERNMENT IN PRESSURE SENSITIVE VINYL FOR AFFIXING BY THE CONTRACTOR.

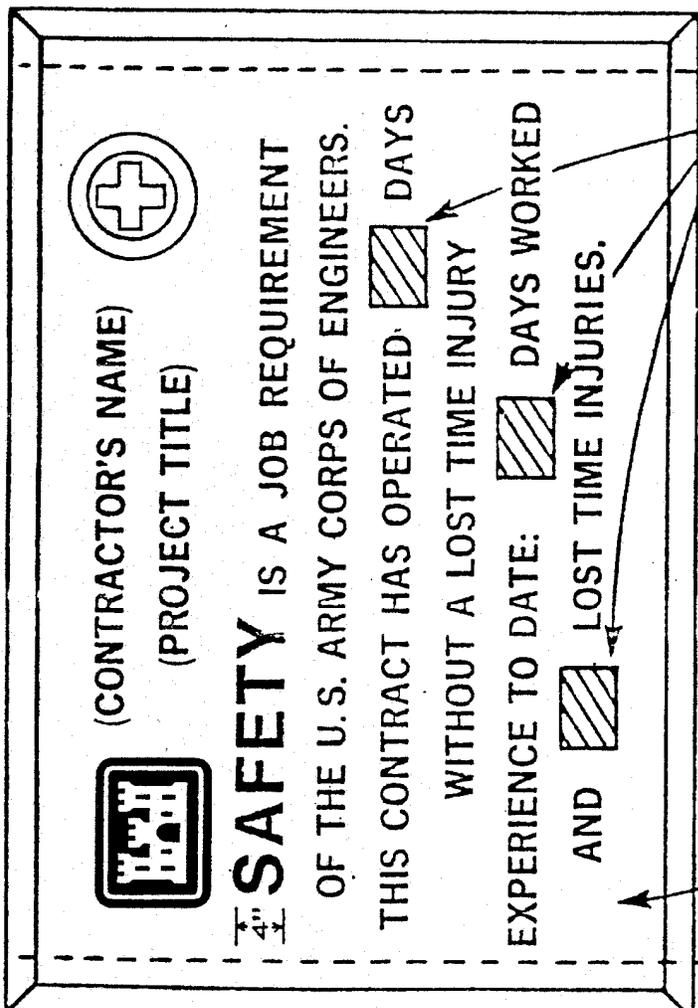
NATURAL GRADE

**LETTERING**

ALL LETTERING IS TO BE HELVETICA BOLD OR HELVETICA MEDIUM. LETTERING SIZE SHALL BE DETERMINED BY THE AMOUNT OF INFORMATION TO BE PRINTED ON SIGN. NO LETTERING HEIGHT SHALL EXCEED THE SIZE SPECIFIED. ALL INFORMATION IS TO BE LAID OUT AS SHOWN.

**PROJECT SIGN**

6'-0"



3/4" EXTERIOR PLYWOOD 4" x 6" PAINTED BLACK

GRADE

4" x 4" POST

	LETTER HGT	STROKE
CONTRACTORS NAME .....	4"	3/16"
PROJECT TITLE .....	3"	3/16"
"SAFETY" .....	4"	1/2"
REMAINING STATEMENT .....	2 1/2"	1/4"

SAFETY SIGN

SIGN MATERIALS

POST 4"x4"; 3/4" EXTERIOR PLYWOOD 4'-0"x6'-0", 2"x2" FRAMING WITH MITERED CORNERS. FRAMING ENCLOSED EDGES OF PLYWOOD AND BE INSTALLED FLUSH ON BACK SIDE AND PROJECTING IN FRONT. OUTSIDE WHITE, HOUSE PAINT-2 COATS; BOTH SIDES AND EDGES; COLORS IN OIL FOR LETTERING - LAMP BLACK AND BULLETIN RED; CASTLE SHALL BE RED; LETTERING SHALL BE BLACK; THE CROSS SHALL BE GREEN

THE CASTLE INSIGNIA SHALL BE FURNISHED BY THE GOVERNMENT IN PRESSURE SENSITIVE VINYL FOR AFFIXING BY THE CONTRACTOR.

## SECTION 01561

ENVIRONMENTAL PROTECTION  
01/01

## PART 1 GENERAL

The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution during, and as the result of, construction operations under this contract except for those measures set forth in the Technical Provisions of these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life or affect other species of importance to man. The control of environmental pollution requires consideration of air, water, and land.

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-05 Preconstruction Submittals

Facility Plan; G AR.

Location of storage and service facilities.

Temporary Plan; G AR.

Temporary excavation and embankments.

## 1.2 APPLICABLE REGULATIONS

The Contractor and his subcontractors in the performance of this contract, shall comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement in effect on the date of this solicitation, as well as the specific requirements stated elsewhere in the contract specifications.

## 1.3 NOTIFICATION

The Contracting Officer will notify the Contractor of any non-compliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. If the Contractor fails or refuses to comply promptly, the Contracting

Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of time lost due to any such stop order shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

#### 1.4 SUBCONTRACTORS

Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

#### 1.5 PROTECTION OF WATER RESOURCES

The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acid construction wastes or other harmful materials. All work under this contract shall be performed in such a manner that objectionable conditions will not be created in streams through or adjacent to the project areas.

#### 1.6 EROSION AND SEDIMENTATION CONTROL

The Contractor shall accomplish the erosion and sedimentation control in accordance with the contract drawings. At the outset of construction, the Contractor will be required to accept by signature a Transferee/Co-Permittee Form. The acceptance of the Transferee/Co-Permittee Form places responsibility on the Contractor to fully adhere to the provisions of the General Permit for erosion and sedimentation control and stormwater management.

#### 1.7 BURNING

Burning will not be allowed.

#### 1.8 DUST CONTROL

The Contractor shall maintain all work area free from dust which would contribute to air pollution. Approved temporary methods of stabilization consisting of sprinkling will be permitted to control dust. Sprinkling, where used, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

#### 1.9 PROTECTION OF LAND RESOURCES

##### 1.9.1 General

It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. Insofar as possible, the Contractor

shall confine his construction activities to areas defined by the plans and specifications or to be cleared for other operations. The following additional requirements are intended to supplement and clarify the requirements of the CONTRACT CLAUSES:

#### 1.9.2 Protection of trees retained

##### 1.9.2.1 Contractors Responsibility

The Contractor shall be responsible for the protection of the tops, trunks and roots of all existing trees that are to be retained on the site. Protection shall be maintained until all work in the vicinity has been completed and shall not be removed without the consent of the Contracting Officer. If the Contracting Officer finds that the protective devices are insufficient, additional protection devices shall be installed.

##### 1.9.2.2 Stockpiling

Heavy equipment, vehicular traffic, or stockpiling of any materials shall not be permitted within the drip line of trees to be retained.

##### 1.9.2.3 Storage

No toxic materials shall be stored within 100 feet (30.5 m) from the drip line of trees to be retained.

##### 1.9.2.4 Confined Area

Except for areas shown on the plans to be cleared, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without special authority. Existing near by trees shall not be used for anchorage unless specifically authorized by the Contracting Officer. Where such special emergency use is permitted, the Contractor shall first adequately protect the trunk with a sufficient thickness of burlap over which softwood cleats shall be tied.

##### 1.9.2.5 Tree Defacing

No protective devices, signs, utility boxes or other objects shall be nailed to trees to be retained on the site.

#### 1.9.3 Restoration of landscape damage

Any trees or other landscape feature scarred or damaged by the Contractor's operations shall be restored as nearly as possible to its original condition at the Contractor's expense. The Contracting Officer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of. All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted. Where tree climbing is necessary, the use of climbing spurs will not be permitted. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving in the opinion of the Contracting Officer,

shall be immediately removed and replaced with a nursery-grown tree of the same species. Replacement trees shall measure no less than 2 inches in diameter at 6 inches above the ground level.

#### 1.9.4 Location of Storage and Services Facilities

The location on project property of the Contractor's storage and service facilities, required temporarily in the performance of the work, shall be upon cleared portions of the job site or areas to be cleared. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. A facility plan showing storage and service facilities shall be submitted for approval to the Contracting Officer. Where buildings or platforms are constructed on slopes, the Contracting Officer may require cribbing to be used to obtain level foundations. Benching or leveling of earth may not be allowed, depending on the location of the proposed facility.

#### 1.9.5 Temporary Excavation and Embankment

If the Contractor proposes to construct temporary roads, embankments or excavations for plant and/or work areas, he shall submit a temporary plan for approval prior to scheduled start of such temporary work.

#### 1.10 MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the work performed in this Section 01561, ENVIRONMENTAL PROTECTION specified herein and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor, and shall be included in the overall cost of the work.

PART 2 PRODUCT  
NOT APPLICABLE

PART 3 EXECUTION  
NOT APPLICABLE

-- End of Section --

## SECTION 01720

AS-BUILT DRAWINGS - CADD  
01/01

## PART 1 GENERAL

## 1.1 Preparation

This section covers the preparation of as-built drawings complete, as a requirement of this contract. The terms "drawings," "contract drawings," "drawing files," and "final as-built drawings" refer to a set of computer-aided design and drafting (CADD) contract drawings in electronic file format which are to be used for as-built drawings.

## 1.2 PROGRESS MARKED UP AS-BUILT PRINTS

The Contractor shall revise one set of paper prints to show the as-built conditions during the prosecution of the project. These as-built marked prints shall be kept current and available on the jobsite at all times. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. The as-built marked prints will be jointly reviewed for accuracy and completeness by the Contracting Officer and a responsible representative of the construction Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings and will continue the monthly deduction of the 10% retainage even after 50% completion of the contract. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and a representative of the Contractor regarding the accuracy and completeness of updated drawings. The prints shall show the following information, but not be limited thereto:

## 1.2.1 Location and Description

The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.

## 1.2.2 Location and Dimensions

The location and dimensions of any changes within the building or structure.

## 1.2.3 Corrections

Correct grade, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

Correct elevations if changes were made in site grading.

#### 1.2.4 Changes

Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

The topography, invert elevations and grades of all drainage installed or affected as a part of the project construction.

All changes or modifications which result from the final inspection.

#### 1.2.5 Options

Where contract drawings or specifications present options, only the option selected for construction shall be shown on the as-built prints.

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-11 Closeout Submittals

Progress Prints; G AR.

Preparation of two copies of as-builts from the Contractor to the Contracting Officer for review and approval.

Final Requirements; G AR.

CADD Files, CALS Files and Paper Prints.

Shall consist of two sets of completed as-built contract drawings on separate media consisting of both CADD files (compatible with AutoCADD 2000 Format on electronic storage media identical to that supplied by the Government) and a CALS Type 1, Group 4, Raster Image File of each contract drawing.

Receipt by the Contractor of the approved marked as-built prints.

#### 1.4 PRELIMINARY SUBMITTAL

At the time of final inspection, the Contractor shall prepare two copies of the progress as-built prints and these shall be delivered to the Contracting Officer for review and approval. These as-built marked prints shall be neat, legible and accurate. The review by Government personnel

will be expedited to the maximum extent possible. Upon approval, one copy of the as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the as-built marked prints are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the as-built marked prints to the Contracting Officer within ten (10) calendar days.

#### 1.5 DRAWING PREPARATION

##### 1.5.1 As-Built Drawings Approval

Upon approval of the as-built prints submitted, the Contractor will be furnished by the Government one set of contract drawings, with all amendments incorporated, to be used for as-built drawings. These contract drawings will be furnished on CD-ROM. These drawings shall be modified as may be necessary to correctly show all the features of the project as it has been constructed by bringing the contract set into agreement with the approved as-built prints, adding such additional drawings as may be necessary. These drawings are part of the permanent records of this project and the Contractor shall be responsible for the protection and safety thereof until returned to the Contracting Officer. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

##### 1.5.2 Proficient Personnel

Only personnel proficient in the preparation of engineering CADD drawings to standards satisfactory and acceptable to the Government shall be employed to modify the contract drawings or prepare additional new drawings. All additions and corrections to the contract drawings shall be equal in quality to that of the originals. Line work, line weights, lettering, layering conventions, and symbols shall be the same as the original line work, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same guidance specified for original drawings. The title block and drawing border to be used for any new as-built drawings shall be identical to that used on the contract drawings. All additions and corrections to the contract drawings shall be accomplished using CADD media files supplied by the Government. These contract drawings will already be compatible with the Using Agency/Sponsor's system when received by the Contractor. The Using Agency/Sponsor uses AutoCAD 2000 on ISO 9660 Format CD-ROM. The Contractor is responsible for providing all program files and hardware necessary to prepare as-built drawings. The Contracting Officer will review all as-built drawings for accuracy and the Contractor shall make all required corrections, changes, additions, and deletions.

##### 1.5.3 Final Revisions

When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the General Contractor in letters at least 3/16 inch high. All other contract

drawings shall be marked either "As-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. All original contract drawings shall be dated in the revision block (SEE ATTACHMENT 1 ) located at the end of this section.

#### 1.6 FINAL REQUIREMENTS

After receipt by the Contractor of the approved marked as-built prints and the original contract drawing files the Contractor shall within 30 days make the final as-built submittal. The submittal shall consist of the following:

a) Two sets of the as-built contract drawings on separate CD's (ISO 9660 Format CD-ROM) consisting of the updated CADD files and a CALS Type 1 Group 4 Raster Image File of each contract drawing plate. The CALS files shall be exact duplicates of the full sized plots of the completed as-built contract drawings at a resolution of 400 dpi and may be either plotted to CALS files directly from the CADD files, or scanned to file from the prints.

b) Two sets of full size paper prints (plots) of the completed as-built contract drawings.

c) The return of the approved marked as-built prints.

They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any translations or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with its CADD system. All paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit as-built drawing files and marked prints as required herein shall be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

#### 1.7 PAYMENT

No separate payment will be made for the as-built drawings required under this contract, and all costs in connection therewith shall be considered a subsidiary obligation of the Contractor.

PART 2 PRODUCT  
NOT APPLICABLE

PART 3 EXECUTION  
NOT APPLICABLE

-- End of Section --

**RECORD DRAWING AS-BUILT  
XYZ CONTRACTOR**

Plate: 1

Sheet Number: T-1

FT. INDIANTOWN GAP PENNSYLVANIA

EQUIPMENT CONCENTRATION SITE

COVER SHEET

U.S. ARMY ENGINEER DISTRICT, BALTIMORE CORPS OF ENGINEERS BALTIMORE, MARYLAND	Designed by:		Date: JAN 2001	Rev.
	Dwn by:	Ckd by:	Design file no.	
A/E FIRM/CONTRACTOR 3 LINES PROVIDED OR LOGO	Reviewed by:		Drawing Number: F-XXX-XX-XX	
	Submitted by: Chief, Branch		File name: FILENAME Plot date: 12/25/00 Plot scale: 1=1	

Mark	Description	Date	Appr.	Mark	Description	Date	Appr.
	AS-BUILT	10 SEP 02					
3	REVISED SECTION A-A AND C-C	5 JAN 01	A.E. / D.P.				
2	REVISED PER AMENDMENT NO. 2	30 DEC 00	A.E. / D.P.				
1	REVISED PER AMENDMENT NO. 1	25 DEC 00	A.E. / D.P.				

## SECTION 02220A

DEMOLITION  
12/97

## 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.

## ENGINEERING MANUALS (EM)

EM 385-1-1 (1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

## 1.2 GENERAL REQUIREMENTS

The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed from project limits daily, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Contracting Officer. In the interest of occupational safety and health, the work shall be performed in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections. In the interest of conservation, salvage shall be pursued to the maximum extent possible; salvaged items and materials shall be disposed of as specified.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Work Plan; G, AR

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and

equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1.

#### 1.4 DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

#### 1.5 PROTECTION

##### 1.5.1 Protection of Personnel

During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

##### 1.5.2 Protection of Structures

Structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Contracting Officer. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

##### 1.5.3 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government; any damaged items shall be repaired or replaced as approved by the Contracting Officer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

##### 1.5.4 Protection From the Weather

Salvageable materials and equipment shall be protected from the weather at all times.

#### 1.5.5 Protection of Trees

Trees within the project site which might be damaged during demolition shall be protected by a 6 foot high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

#### 1.5.6 Environmental Protection

The work shall comply with the requirements of Section 01561 ENVIRONMENTAL PROTECTION.

#### 1.6 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

#### 1.7 USE OF EXPLOSIVES

Use of explosives will not be permitted.

#### 1.8 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available in accordance with Section 01050, JOB CONDITIONS.

### PART 2 PRODUCTS (Not Applicable)

### PART 3 EXECUTION

#### 3.1 EXISTING STRUCTURES

Existing structures indicated shall be removed to 2 feet below grade. Sidewalks, curbs, gutters, railroad ties and rails shall be removed.

#### 3.2 UTILITIES

Existing utilities shall be removed as indicated. When utility lines are encountered that are not indicated on the drawings, the Contracting Officer shall be notified prior to further work in that area.

#### 3.3 FILLING

Holes, and other hazardous openings shall be filled as directed by the Contracting Officer.

#### 3.4 DISPOSITION OF MATERIAL

Title to material and equipment to be demolished, except Government salvage and historical items, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or

damage to such property after notice to proceed.

#### 3.4.1 Salvageable Items and Material

Contractor shall salvage items and material to the maximum extent possible.

##### 3.4.1.1 Material Salvaged for the Contractor

Material salvaged for the Contractor shall be stored as approved by the Contracting Officer and shall be removed from Government property before completion of the contract. Material salvaged for the Contractor shall not be sold on the site.

##### 3.4.1.2 Items Salvaged for the Government

Salvaged items to remain the property of the Government shall be removed in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage shall be repaired or replaced to match existing items. Containers shall be properly identified as to contents. The following items reserved as property of the Government shall be delivered to the areas designated: Courthouse Concrete Gutter and Granite Curb, post and chain fences and signs.

#### 3.4.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of off site. Combustible material shall be disposed of off the site.

#### 3.5 CLEAN UP

Debris and rubbish shall be removed from excavations. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

#### 3.6 PAVEMENTS

Existing pavements designated for removal shall be saw cut and removed in accordance with the details shown on the drawings and to the limits and depths indicated on the drawings and to their full depth.

-- End of Section --

## SECTION 02230A

CLEARING AND GRUBBING  
06/97

## PART 1 GENERAL

## 1.1 SCOPE

The work covered by this section consists of furnishing all labor and equipment and performing all work required for clearing, grubbing and disposal of all vegetation, trees, and stumps off-site, and clearing of debris, trash and materials resulting from clearing operations within the limits indicated herein and as directed by the Contracting Officer. The clearing and grubbing operations shall be performed on all areas to be stripped, excavated, or to receive materials. Clearing shall not extend more than 10 feet beyond the limits of all excavations and fills and existing embankment toes, unless otherwise directed. Limit of work shall not be interpreted to mean limit of clearing. Clearing beyond these limits to construct haul roads or to safely operate equipment shall be approved on a case by case basis. Items to be cleared shall be marked by the Contractor and approved by the Contracting Officer prior to commencement of any clearing or grubbing operations.

## 1.2 DEFINITIONS

## 1.2.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

## 1.2.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Materials Other Than Salable Timber

Refuse from the clearing and grubbing operations.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

3.4.1 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of the project at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed. Disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.

-- End of Section --

## SECTION 02316A

EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS  
05/02

## 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 D 1556	(1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2487	(1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R1996e1) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

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SPECIFICATIONS

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## 1.2 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When

used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

#### SD-06 Test Reports

Field Density Tests  
Testing of Backfill Materials; G ED

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML.

#### 2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

#### 2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials shall include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

#### 2.1.4 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

#### 2.1.5 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

#### 2.1.6 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable

particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1 inch sieve. The maximum allowable aggregate size shall be 2 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

#### 2.1.7 Initial Backfill Material

Initial backfill shall meet the quality requirements and conform to Pennsylvania Department of Transportation Publication 408 Specification, Section 703.1, Fine Aggregate Cement Concrete Sand Type A.

#### 2.2 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Yellow:	Gas, Oil, Dangerous Materials
Orange:	Telephone, Telegraph, Television, Police, and Fire Communications
Blue:	Water Systems
Green:	Sewer Systems

#### 2.3 Detection Wire For Non-Metallic Piping

Detection wire shall be insulated single strand, solid copper with a minimum diameter of 12 AWG.

### PART 3 EXECUTION

#### 3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be accomplished as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph BACKFILLING AND COMPACTION at no additional cost to the Government. Excavation and backfilling of utilities within the

limits of the levee embankment and foundation shall be performed with materials as shown on the drawings and in accordance with Sections 02329 and 02331 of the specifications.

#### 3.1.1 Trench Excavation Requirements

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 4 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than or equal to 24 inches inside diameter and shall not exceed 36 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

##### 3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for of each section of the pipe. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

##### 3.1.1.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

##### 3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

##### 3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members.

Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

### 3.1.2 Stockpiles

There is very limited space on site for the stockpiling of backfill materials. All unsatisfactory and waste materials shall be immediately disposed of off-site by the Contractor. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment or smooth drum roller., Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Contracting Officer.

## 3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material, select granular material, or initial backfill material as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

### 3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown. The trench shall be backfilled to 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

#### 3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

#### 3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

#### 3.2.1.3 Bedding and Initial Backfill

Initial backfill material shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit.

The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

#### 3.2.1.4 Final Backfill

The remainder of the trench, except for special materials beneath roadways and parking lots, shall be filled with satisfactory material. Beneath roadways and parking lots the final backfill material for the remainder of the trench shall consist of select granular material. Backfill material shall be placed and compacted as follows:

- a. Roadways and Parking Lot: Backfill shall be placed up to the elevation shown on the drawings and shall be placed and compacted to the requirements as specified in paragraph 3.2. Water flooding or jetting methods of compaction will not be permitted.
- b. Sidewalks, Turfed or Seeded Areas and Miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.
- c. Adjacent to the Solomon Storage Building: Backfill shall consist of satisfactory material, which shall be placed and compacted to the requirements as specified in paragraph 3.2

#### 3.2.2 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

### 3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

#### 3.3.1 Water Lines

Trenches shall be of a depth to provide a minimum cover of 4 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe.

#### 3.3.2 Heat Distribution System

Initial backfill material shall be free of stones larger than 1/4 inch in any dimension.

### 3.3.3 Electrical Distribution System

Direct burial cable and conduit or duct line shall have a minimum cover of 24 inches from the finished grade, unless otherwise indicated.

### 3.3.4 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 18 inches below finished grade unless otherwise shown.

## 3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

### 3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer.

### 3.4.2 Testing of Backfill Materials

Classification of backfill materials shall be determined in accordance with ASTM D 2487 and the moisture-density relations of soils shall be determined in accordance with ASTM D 1557. A minimum of one soil classification and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

### 3.4.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 100 feet of installation shall be performed. One moisture density relationship shall be determined for every 1500 cubic yards of material used. Field in-place density shall be determined in accordance with ASTM D 1556 or ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job, on each different type of material encountered, at intervals as directed by the Contracting Officer. Copies of calibration curves, results of calibration tests, and field and laboratory density tests shall be furnished to the Contracting Officer. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

#### 3.4.4 Displacement of Sewers

After other required tests have been performed and the trench backfill compacted to 2 feet above the top of the pipe, the pipe shall be inspected to determine whether significant displacement has occurred. This inspection shall be conducted in the presence of the Contracting Officer. Pipes shall be inspected by shining a light or laser between manholes or manhole locations, or by the use of television cameras passed through the pipe. If, in the judgement of the Contracting Officer, the interior of the pipe shows poor alignment or any other defects that would cause improper functioning of the system, the defects shall be remedied as directed at no additional cost to the Government.

-- End of Section --

## SECTION 02329

## STRIPPING AND EXCAVATION FOR EMBANKMENTS AND CLOSURE STRUCTURE

## PART 1 GENERAL

## 1.1 General

The work covered by this section consists of furnishing all labor, plant, equipment, and materials, and performing all operations in connection with stripping and excavation for the levee embankment, closure structure, and associated structures. It also includes all related work involving disposal of unsuitable materials, and all other work incidental to the stripping and excavation under this contract.

## 1.2 DEFINITIONS:

## 1.2.1 STRIPPING:

After inspection and approval of cleared areas and demolition, stripping may proceed. The stripping operation shall be performed to a depth of 6 inches on all areas to be excavated or to receive materials, except as noted on the drawings and specified herein. Removal of the top 6 inches of gravel areas at the Courthouse parking lot shall be considered as part of the stripping operations.

## 1.2.2 EXCAVATION:

Excavation shall be unclassified and shall include the excavation of the existing levee embankments, rirap, foundation soils , excavation for structures, and other required excavations.

## 1.2.3 UNSATISFACTORY SUBGRADE MATERIALS

Unsuitable subgrade materials for the subgrade beneath the levee and closure structure shall be those materials classified in ASTM D 2487 as MH, CH, Pt, OH, and OL, or combinations thereof. Unsuitable subgrade materials shall also include those materials containing roots and other organic matter, trash, debris, and frozen materials.

## 1.2.4 SATISFACTORY SUBGRADE SOILS

Satisfactory soils for the subgrade of the levee and closure structure shall consist of all subgrade soils except as specified in the above paragraph UNSATISFACTORY SUBGRADE MATERIALS.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be

submitted in accordance with Section Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Stripping Sequence Plan; G AR

Disposal of Materials.

SD-05 Design Data

Dewatering Plan; G AR

Shoring; G AR

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL:

Stripping and excavation shall consist of removal of material to the lines and grades shown on the drawings, or as otherwise directed or approved by the Contracting Officer. The limits of all items of work will be as shown on the drawings or as defined herein

3.2 STRIPPING

All areas of required excavation and areas to receive embankment fill and backfill, unless otherwise noted on the drawings, or as otherwise directed by the Contracting Officer shall be stripped to a depth of 6 inches or to such additional depth as required to remove all organic material and topsoil. Stripped material shall be spoiled off site in an area provided by the Contractor. Stripping shall not greatly precede excavation or fill placement operations and no area will be stripped until approved by the Contracting Officer. The Contractor shall submit a Stripping Sequence Plan which describes the sequencing of the stripping operations and the estimated time period that stripped areas will be exposed prior to fill placement or excavation. The Stripping Sequence Plan shall be approved by the Contracting Officer prior to any stripping work.

3.3 EXCAVATION:

3.3.1 GENERAL EXCAVATION:

After stripping, excavation shall proceed to the specified lines and grades as shown on the drawings unless otherwise directed by the Contracting Officer. All excavated material shall be disposed of as stated in paragraph "DISPOSAL OF MATERIALS". However, material excavated from the existing levee embankment which meet the requirements for impervious fill may be utilized in the new the levee embankment. Excavation below indicated depths will not be permitted except to remove unsatisfactory

subgrade material. Unsatisfactory subgrade material encountered below the grades shown shall be removed to the depths and lateral limits as directed and shall be replaced with appropriate backfill materials as approved by the Contracting Officer. If any materials are removed beyond the lines and grades shown on the drawings, or as otherwise specified or approved by the Contracting Officer, the Contractor will replace and compact material as necessary to reestablish, to the satisfaction of the Contracting Officer, the correct lines and grades. All excavations within 3 feet of concrete structures will be accomplished by hand-held equipment.

3.3.2 EXCAVATION FOR CLOSURE STRUCTURE AND UTILITIES LOCATED WITHIN THE LIMITS OF THE LEVEE EMBANKMENT AND CLOSURE FOUNDATION:

Excavation for the closure structure shall extend a sufficient distance (12 inch minimum) beyond the wall and footings to allow for placing and removal of backfill material as shown on the drawings. Unsatisfactory material encountered beyond the depths indicated shall be removed to the depths and lateral limits as directed and shall be replaced with appropriate backfill materials as approved by the Contracting Officer. Determination of elevation of approved over-depth excavations shall be done in the presence of the Contracting Officer. Excavation to the final grade level shall not be made until just before backfilling or piling driving. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.4 DRAINAGE AND DEWATERING FOR EXCAVATION:

3.4.1 DRAINAGE:

Excavation shall be performed so that the area of the site and the area immediately surrounding the site and affecting operations at the site will be continually and effectively drained. Water shall not be permitted to accumulate in the excavation. The excavation shall be drained by pumping or other satisfactory methods to prevent softening of the subgrade or other actions detrimental to proper construction procedures. Surface water shall be directed away from excavation and construction sites so as to prevent erosion. Diversion ditches, dikes and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfilled surfaces shall be protected to prevent erosion and sloughing. Drainage shall comply with the requirements of SECTION 01561, ENVIRONMENTAL PROTECTION.

3.4.2 DEWATERING:

a.) The Contractor shall be aware of the subsurface water levels recorded and the dates these levels were recorded on the boring logs. These water levels are only for the dates shown on the logs and it can be expected that the water table may fluctuate. The Contractor shall also note the fluctuation of the North Branch of the Susquehanna River. Stream flow records are available from USGS. During construction, special care shall be taken to insure that excavations for foundations are accurate and no excavation for structures, which will be influenced by groundwater, shall be made to final grade until dewatering has been

accomplished to the satisfaction of the Contracting Officer. Prior to installation, the Contractor shall submit his dewatering plan to the Contracting Officer for review. If dewatering is to be accomplished by means of pumping from a sump, the sump shall be located at least 10 feet from the edge of the structure. The Contractor will be required to provide suitable protection to the sump pit walls and the excavated areas to insure that fine-drained soils are not removed during the pumping operations. The Contractor is responsible for draining or dewatering all areas of excavation to the extent and by the means necessary to allow for proper placement of fills and backfills. Dewatering plan shall be subject to the approval of the Contracting Officer. Water from dewatering operations shall not be discharged directly into the North Branch Susquehanna River.

b.) Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, ditches, or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Dewatering measures shall be implemented prior to the time the excavation reaches the anticipated water level in order to maintain the integrity of the in situ material

### 3.5 SHORING

Shoring, shall be furnished and installed as necessary to protect workmen, banks, adjacent paving, structures, and utilities. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving, unless otherwise indicated on the drawings or as directed by the Contracting Officer. The shoring and bracing system must be designed by a registered professional engineer having at least 5 years experience in the design of temporary sheeting and shoring systems. The sheeting and shoring plan must be submitted at least 30 days prior to installation, and installation shall not commence until approval of the submittal is given.

### 3.6 DISPOSAL OF MATERIALS:

All noncombustible material from required excavation shall be placed off-site in an area provided by the Contractor, at the expense and responsibility of the Contractor, unless otherwise approved by the Contracting Officer. Disposal of spoil material shall not be made without the permission of the property owners and the Contractor shall make all arrangements for disposal and furnish the Contracting Officer written evidence of the permission of the property owner. It will be the responsibility of the Contractor to obtain all necessary State and local requirements for transportation and spoiling of the material.

### 3.7 SLIDES:

In the event of a slide in either embankment or excavation slopes, the Contractor shall notify the Contracting Officer immediately, halt all

excavation and placement in the vicinity of the slide, and await further instructions.

### 3.8 PROTECTION OF EXISTING STRUCTURES, UTILITIES, AND INSTRUMENTATION:

Prior to stripping and excavation activities, the Contractor shall verify the locations of all existing structures, instruments, and utilities adjacent to and within the limits of work. It shall be the responsibility of the Contractor to protect all existing structures, instrumentation, and utilities adjacent to the excavation by any means required to assure their integrity. Any structure, utility, or instrumentation damaged by the Contractor shall be repaired or replaced as determined by the Contracting Officer and at the Contractor's expense. Depending on the Contractor construction methods and operations for the closure structure excavation, it may be necessary to provide temporary bracing of the existing stone wall adjacent to any excavation in order to prevent movement of the wall and foundation.

### 3.9 BORROW AREAS:

It shall be the responsibility of the Contractor to obtain embankment and backfill materials from approved off-site borrow sources. No separate measurement or payment will be made for borrow excavation, and all cost of such work shall be included in the appropriate payment items as specified in SECTION 01270: MEASUREMENT AND PAYMENT.

### 3.10 QUALITY CONTROL:

The Contractor shall establish and maintain quality control as required in SECTION 01451: CONTRACTOR QUALITY CONTROL (CQC) in the SPECIAL CLAUSES.

-- End of Section --

02331

## LEVEE EMBANKMENT CONSTRUCTION AND BACKFILLING FOR CLOSURE STRUCTURE

## PART 1 GENERAL

## 1.1 GENERAL:

The work covered by this section consists of furnishing all plant, labor, materials, and equipment, and performing all operations in connection with construction of the levee embankments, backfilling adjacent to the closure structures, subgrade work for pavement, and other incidental work as may be necessary to complete the work in accordance with the drawings, as specified herein, and as directed by the Contracting Officer.

## 1.2 APPLICABLE PUBLICATIONS

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 C 117	(1995) Materials Finer than 75 um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	(1996) Sieve Analysis of Fine and Coarse Aggregate
ASTM D 422	(1963; R 1998) Particle-Size Analysis of Soils
ASTM D 698	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 854	(1998) Specific Gravity of Soils
ASTM D 1556	(1990; R 1996) Density of Soil in Place by the Sand-Cone Method)
ASTM D 2216	(1998) Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	(1989) Classification of Soils for Engineering Purposes
ASTM D 2922	(1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1996) Moisture Content of Soil and

Soil-Aggregate in place by Nuclear Methods  
(Shallow Depth))

ASTM D 4318

(1998) Test Method for Liquid Limit,  
Plastic Limit, and Plasticity Index for  
Soils

ASTM D 4718

(1987; R 1994) Correction of Unit Weight  
and Water Content for Soil Containing  
Oversize Particles

ASTM D 5519

(1994) Particle Size Analysis of Natural  
and Man-Made Riprap Materials

COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF TRANSPORTATION  
SPECIFICATIONS

Publication 408

(2000)

### 1.3 DEFINITIONS

#### 1.3.1 EMBANKMENT

The terms "levee" or "embankment" as used in these specifications are defined as the earth fill portions of the levee structure or other fills related to the levee structure.

#### 1.3.2 BACKFILL

The term "backfill" as used in this section is defined as fill material which cannot be placed around or adjacent to a structure until the structure is completed or until a specified time interval has elapsed after completion.

#### 1.3.3 STRIPPING AND EXCAVATION:

Stripping and excavation shall consist of removal of material to the lines and grades shown on the drawings, or as otherwise directed or approved by the Contracting Officer. Excavation under this contract is defined in SECTION 02329, STRIPPING AND EXCAVATION FOR EMBANKMENTS AND CLOSURE STRUCTURE.

#### 1.3.4 CLASSIFICATION OF SOILS

Materials used to construct the embankments and for backfills shall be classified in accordance with ASTM D 2487 (Unified Soil Classification System).

#### 1.3.5 DEGREE OF COMPACTION

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698, abbreviated hereinafter as percent laboratory maximum dry density.

#### 1.4 GENERAL CONDITIONS

##### 1.4.1 LINES AND GRADES

The embankment and backfill shall be constructed to the lines, grades, and cross sections indicated on the drawings, unless otherwise directed by the Contracting Officer. The Government reserves the right to increase or decrease the foundation widths and embankment slopes, or to make such other changes in the embankment or backfill sections as may be deemed necessary to produce a safe structure. The end slopes and side slopes of partial fill sections shall not be steeper than 1V on 1.5H, unless otherwise shown on the drawings or approved by the Contracting Officer.

##### 1.4.2 CONDUCT OF THE WORK

The Contractor shall maintain and protect the embankment and backfill in a satisfactory condition at all times until final completion and acceptance of all work under the Contract. If, in the opinion of the Contracting Officer, the hauling equipment causes horizontal shear planes or slickensides, rutting, quaking, heaving, cracking, or excessive deformation of the embankment or backfill, the Contractor shall limit the type, load, or travel speed of the hauling equipment on the embankment or backfill. Any approved embankment or backfill material which is lost in transit or rendered unsuitable after being placed in the embankment or backfill and before final acceptance of the work shall be replaced by the Contractor in a satisfactory manner and no additional payment will be made therefor. The Contractor shall excavate and remove from the embankment or backfill any material which the Contracting Officer considers objectionable and shall also dispose of such material and refill the excavated area as directed, all at no cost to the Government. The Contractor may be required to remove, at his own expense, any embankment or backfill material placed outside of prescribed slope lines.

##### 1.4.3 MATERIALS:

Materials for embankment and backfill construction will be obtained from sources provided by the Contractor and from commercial sources. However, material excavated from the existing levee embankment which meet the requirements for impervious fill may be utilized in the new the levee embankment. All roots, limbs, and wood splinters shall be removed from embankment materials. Materials containing sod or other organic or perishable material shall not be used in the embankment. The Contractor shall submit to the Contracting Officer the source or sources from which he intends to obtain materials for embankment construction. This information shall be submitted with the initial soil samples obtained from the borrow sources. It shall be the responsibility of the Contractor to obtain Federal, State, and local borrow excavation permits and to comply with those requirements, which may be required for borrow excavation, sediment and erosion control, and reclamation of any borrow areas. The Contracting Officer will require samples of materials from borrow areas and/or

processing plants, from areas of required excavation where the material is intended for use in the embankment, and from materials in-place in the embankment and backfill once every two weeks, every 750 cubic yards, or at a change of material source, whichever occurs first. The sample size (weight) for each material type shall be determined by the Contracting Officer. The Contractor shall furnish equipment and labor required to obtain these samples at no additional cost to the Government in accordance with the SPECIAL CLAUSES.

#### 1.4.4 TEMPORARY ROADS, FILLS, AND EMBANKMENTS:

Requirements for temporary construction items such as haul roads, embankments, and other items are specified in SECTION 01510, TEMPORARY CONSTRUCTION ITEMS. The below paragraphs provide a brief summary of the requirements specified in SECTION 01510 for temporary roads and embankments.

##### 1.4.4.1 TEMPORARY HAUL ROADS AND RAMPS:

Haul roads and ramps shall be located and constructed as approved by the Contracting Officer. They shall be designed to maintain the intended traffic, be free draining, and be maintained in good condition throughout the contract period. The Contractor shall phase the construction activity to minimize traffic and hauling on the existing and new embankments to avoid rutting, shearing, and damage to the embankment material. The hauling equipment shall be operated at speeds which will not damage structures and homes adjacent to the site.

##### 1.4.4.2 TEMPORARY FILLS AND EMBANKMENTS:

Depending on the operations and equipment selected by the Contractor to perform the work in accordance with the specifications and drawings, temporary fills and embankments may be required. All temporary fills and embankments shall be designed by the Contractor and shall be submitted for review and approval by the Contracting Officer. The Contractor shall be responsible for the design and all impacts to adjacent areas and structures from these temporary embankments and fills, which shall be maintained in good condition throughout their use. Upon completion of work, temporary embankments and fills shall be removed and the area retored to the original grades or finished grades as shown on the drawings at the expense of the Contractor.

##### 1.4.5 STOCKPILING

In general, materials for embankment construction should be delivered at a rate needed for immediate placement, and temporary stockpiling should be avoided. Any on-site stockpiling of embankment materials shall be at areas approved by the Contracting Officer and shall be accomplished in an approved manner. No stockpiling will be permitted on the existing levee embankment. No payment will be made for such stockpiling nor for the reloading and hauling of these materials to their final position.

##### 1.4.6 SLIDES:

In the event a slide in the embankment or any noticeable movement occurs

during excavation or embankment construction, the Contractor shall notify the Contracting Officer immediately, halt all work, and await further instructions.

#### 1.4.7 PROTECTION OF EXISTING STRUCTURES AND INSTRUMENTATION:

It shall be the responsibility of the Contractor to protect all existing utilities, structures, and instrumentation as shown on the drawings adjacent to all fill placement by any means required to assure their integrity. Extreme care will be required during placement and compaction of the fill. The Contractor may have to provide some type of temporary protection barrier to insure that structures and instruments are not damaged. Any structure, utility, or instrumentation damaged by the Contractor shall be repaired or replaced as determined by the Contracting Officer and at the Contractor's expense. Depending on the Contractor construction methods and operations for the closure structure, it will be necessary to provide temporary bracing of the existing stone wall adjacent to the work area in order to prevent movement of the wall and foundation during excavation, pile driving, and backfilling operations.

#### 1.4.8 RIVER STAGE MONITORING:

The Contractor shall monitor the North Branch of the Susquehanna River for fluctuation in the river stages during construction. Stream flow records are available from USGS. The Contractor shall be prepared to immediately backfill any open excavation with appropriate material or reconstruct the levee embankment (to its original grades) during a flood emergency at the direction of the Contracting Officer.

#### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Borrow Excavation Permits

SD-03 Product Data

Compaction Equipment; G ED

SD-04 Samples

Samples of Materials; G ED

SD-06 Test Reports

Materials; G ED.

Daily Laboratory Test Results

Bi-weekly Summary Report

Final Embankment QC Testing Report

Rockfill Gradation Testing; G ED

SD-07 Certificates

Materials and Test Results; G, ED

## PART 2 PRODUCTS/MATERIALS

### 2.1 MATERIALS

Materials for embankment and backfill construction will be obtained from sources provided by the Contractor and from commercial sources. All roots, limbs, and wood splinters shall be removed from embankment materials. Materials containing sod or other organic or perishable material shall not be used in the embankment.

### 2.2 IMPERVIOUS FILL

Impervious fill will be required for the earth embankment and shall be obtained by the Contractor. The impervious fill materials shall have a plasticity index (PI) not less than 3 as determined by ASTM D 4318 testing method. The impervious fill shall have 100% of the material by weight passing the 3" sieve and shall have at least 20% of the material passing a Standard No. 200 sieve; however, the maximum stones and rock fragments permitted in any lift shall not exceed 2/3 the uncompacted lift thickness measured by the greatest dimension. The impervious fill shall consist of materials classified in ASTM D 2487 as clays (CL), silty or sandy clays (CL-ML, CL); silts (ML), clayey sands (SC), or clayey gravels (GC); and sands and gravels that are well graded (SM & GM). All stones and rock fragments larger than 4 inches measured by the greatest dimension shall be removed at the source prior to hauling to the fill. Uniform silts or sands, soft organic soils, frozen materials, or other soils deemed unsuitable by the Contracting Officer shall not be utilized in the impervious fill. Uniform silts or sands are defined as silts and sands with a uniformity coefficient ( $C_u = D_{60}/D_{10}$ ) which is less than 6. "Any residual materials" (which is defined as any material other than natural soils in their original deposited state) to be used as impervious material shall be sampled and analyzed for chemical contamination. The Contractor shall collect one composite soil sample for every 750 cubic yards of material obtained from each source. Sampling shall be accomplished in the presence of the Contracting Officer or his designated representative. The sample shall be analyzed for contaminants using the following SW-846 methods: 8260 for TCL volatile organic compounds, 8270 for TCL semivolatile organic compounds, and 6010 & 7000 series for RCRA metals. The fill material shall meet PA State Regulations for clean fill guidance and land recycling limits and all other applicable local, state, and federal guidelines. Results of the testing shall be submitted to the Contracting Officer for approval 30 days prior to bringing the material on site."

## 2.3 FINE DRAINAGE FILL

Fine aggregate for the fine drainage fill within the levee embankment shall meet the quality requirements and conform to Pennsylvania Department of Transportation Publication 408 Specification, Section 703.1, Fine Aggregate Cement Concrete Sand Type A, as shown below.

<u>Sieve Size</u> <u>U.S. Standard Square Mesh</u>	<u>Percentage by Weight Passing</u> <u>Individual Sieve</u>
3/8-inches	100
No. 4	95-100
No. 8	70-100
No. 16	45-85
No. 30	25-65
No. 50	10-30
No. 100	0-10
No. 200	0-3

Note that the weight of the material finer than the No. 200 sieve shall be determined by washing the sample in accordance with ASTM C117.

## 2.4 COARSE DRAINAGE FILL

The material for the coarse drainage fill shall be Type B or better and conform to the quality and gradation requirements for AASHTO #57 coarse aggregate as specified in Tables B and C, respectively of Section 703.2 of the Pennsylvania Department of Transportation Specification, Publication 408 , as shown below.

<u>Sieve Size</u> <u>U.S. Standard Square Mesh</u>	<u>Percentage by Weight Passing</u> <u>Individual Sieve</u>
1 1/2-inches	100
1-inches	95-100
1/2-inches	25-60
No. 4	0-10
No. 8	0-5

Additionally, the drainage fill materials shall not contain any organic matter or soft friable particles in quantities considered objectionable by the Contracting Officer.

## 2.5 2A COARSE AGGREGATE

The 2A coarse aggregate shall be Type B or better and conform to the quality and gradation requirements for No. 2A coarse aggregate as specified in Tables B and C, respectively of Section 703.2 of the Pennsylvania Department of Transportation Specification, Publication 408, as shown below.

<u>Sieve Size</u> <u>U.S. Standard Square Mesh</u>	<u>Percentage by Weight Passing</u> <u>Individual Sieve</u>
2-inches	100
3/4-inches	52-100
3/8-inches	36-70

No. 4	24-50
No. 16	10-30
No. 200	0-10

Additionally, the 2A coarse aggregate fill shall not contain any organic matter or soft friable particles in quantities considered objectionable by the Contracting Officer. The material finer than then No. 200 sieve shall be non-plastic.

## 2.6 ROCKFILL

Stone for the rockfill shall consist of various sizes of hard, durable and sound sandstones, siltstones, and hard shales. Soft shale rock which breaks down due to movement of hauling and spreading equipment will not be permitted in the rockfill. The stones shall be free from cracks, seams, and other defects that would tend to increase unduly its deterioration from natural causes. The stones shall be as blocky in shape. The acceptability of the rockfill materials and the stone shapes shall be approved by the Contracting Officer. The rockfill shall be a reasonably well graded mixture of stone with the maximum weight not exceeding 300 pounds, and with a minimum weight of at least 3 pounds. Not more than 10% by weight of soil and rock fragments passing the 3-inch screen will be permitted within the rockfill material.

## PART 3 EXECUTION

### 3.1 STRIPPING AND EXCAVATION:

Stripping and excavation shall consist of removal of materials to the specified lines and grades as shown on the drawings and described in SECTION 02329, STRIPPING AND EXCAVATION FOR EMBANKMENTS AND CLOSURE STRUCTURE, or as otherwise directed or approved by the Contracting Officer.

### 3.2 DRAINAGE AND DEWATERING

Fill placement operations shall be performed so that all fills and areas receiving fill will be continually and effectively drained. Water shall not be permitted to accumulate on the fills. No fill shall be placed in water. The Contractor is responsible for draining or dewatering all excavations and areas to receive fills to the extent and by the means necessary to allow for proper placement of embankment fills and backfills. Dewatering methods shall be subject to the approval of the Contracting Officer. Drainage and dewatering requirements are specified in SECTIONS 01561 and 02329.

### 3.3 SUBGRADE

Satisfactory subgrade soils which are rendered unsuitable by the contractor due to inadequate site and/or excavation drainage or due to negligence by working (remolding) or compacting otherwise satisfactory in place subgrade soils under adverse moisture conditions shall be removed and replaced with satisfactory fill material or shall be worked or altered until rendered suitable as determined by the Contracting Officer, at no additional cost to

the Government. All subgrade areas, outside the limits of the existing levee embankment, to receive fill, pavements, or structures shall be proof rolled in the presence of the Contracting Officer. Proof rolling shall consist of the application of at least five coverages with either the specified crawler tractor or smooth drum roller, or with compaction equipment approved by the Contracting Officer. Areas shown to be unstable or nonuniform by proof rolling shall either be recompacted; removed, dried, and recompacted; or removed and replaced with satisfactory backfill material, as directed by the Contracting Officer. Proof rolling shall be done immediately prior to placement of the fill and backfill materials. If the subgrade is left exposed and in the opinion of the Contracting Officer, the subgrade has become too wet or too dry to facilitate proper compaction, the subgrade shall be scarified and wetted or dried as required to ensure proper moisture limits for compaction of the subgrade and adjacent fills, at no additional cost to the Government

### 3.4 PLACEMENT AND SPREADING

#### 3.4.1 GENERAL

No fill shall be placed on any part of the existing embankment and the foundations for the new embankments and structures until such areas have been inspected and given final approval by the Contracting Officer. Fill shall be placed to the lines and limits shown on the drawings. The gradation and distribution of materials through-out each zone of the fill shall be such that the embankment will be free from lenses, pockets, streaks, and layers of material differing substantially in texture or gradation from surrounding material of the same class. Successive loads of material shall be placed at locations on the fill as directed or approved by the Contracting Officer. No fill shall be placed upon a frozen surface, nor shall snow, ice, or frozen earth be incorporated in the embankment. Placing operations will be such as to avoid mixing of materials from adjacent sections as much as practicable. Where new material ties into the existing levee, every lift of new embankment material shall be benched into the existing embankment slope a minimum of 12-inches. Equipment traffic on any embankment zone shall be routed to distribute the compactive effort as much as practicable. Ruts formed in the surface of any layer of spread material will be filled before that material is compacted. If, in the opinion of the Contracting Officer, the compacted surface of any layer of material is too smooth to bond properly with the succeeding layer, the surface shall be loosened by scarifying before material from the succeeding layer is placed. Scarifying shall be accomplished using disks or harrows scarifying equipment or other methods approved by the Contracting Officer. During the placing and spreading process, the Contractor shall maintain at all times a force of workers adequate to remove all roots, debris, and oversize stone from all embankment materials. Heavy hauling and spreading equipment shall be kept at a minimum of 3 feet away from existing structures or farther as deemed necessary to protect the structure. The Contractor will be held responsible for any damage occurring to structures during construction operations.

#### 3.4.2 IMPERVIOUS FILL

Impervious fill material shall be placed and spread in layers not more than

8 inches in uncompacted thickness. In addition, the type of tamping roller selected by the Contractor shall also govern the permitted lift thickness for the impervious fill. In confined areas and within 3 feet of structures where small hand operated compaction equipment are used to compact the fill, the uncompacted lift thickness shall be reduced to 4 inches. The maximum stones and rock fragments permitted in any lift shall not exceed  $\frac{2}{3}$  the uncompacted lift thickness measured by the greatest dimension. All stones and rock fragments larger than the permitted size shall be removed from the fill prior to compaction. If lenses, pockets, or layers of materials differing substantially in texture or gradation from surrounding material occur in the spread material, the layer shall be mixed by harrowing or any other approved method to blend the materials.

#### 3.4.3 FINE DRAINAGE FILL

Fine drainage fill material shall be placed in layers having an uncompacted thickness of not more than 8 inches. In confined areas and within 3 feet of structures where small hand operated compaction equipment are used to compact the fill, the uncompacted lift thickness shall be reduced to 4 inches. The drainage fill materials shall be placed in a controlled manner to minimize contamination with other embankment materials. The drainage fill in the levee will be kept at all times at an elevation higher than the adjacent fills

#### 3.4.4 COARSE DRAINAGE FILL

Since the coarse drainage fill material will be placed in confined areas and within 3 feet of structures, small hand operated compaction equipment shall be used to compact the fill. The uncompacted lift thickness shall not be greater than 6 inches. The drainage fill materials shall be placed in a controlled manner to minimize contamination with other embankment and backfill materials.

#### 3.4.5 2A COARSE AGGREGATE

The 2A coarse aggregate shall be placed in layers having an uncompacted thickness of not more than 12 inches. In confined areas and within 3 feet of structures where small hand operated compaction equipment are used to compact the fill, the uncompacted lift thickness shall be reduced to 6 inches. The 2A coarse aggregate shall be placed in a controlled manner to minimize contamination with other embankment materials.

#### 3.4.6 ROCKFILL

Rockfill shall be placed within the limits indicated on the drawings in such a manner as to produce a reasonably well graded mass of stone with a minimum percentage of voids. The rockfill shall be free from pockets of small stones and clusters of larger stones. The desired distribution of the various sizes of stones throughout the mass may be obtained, at the option of the Contractor, either by selective loading at the quarry or other source, by controlled dumping of successive loads during final placing, or by a combination of these methods. The rockfill shall be placed, and where possible, bulldozed into place in layers not more than 15 inches in thickness. A small reach of the rockfill will be placed through

water by dumping and bulldozing into place as necessary. The placing and spreading shall be supplemented by such hand methods as are required to obtain even surfaces on the road surface and the outside face of the slope.

A tolerance of plus 6 inches and minus 6 inches measured perpendicular from the slope lines and grades shown on the drawings will be allowed in the finished surfaces of the rockfill.

### 3.5 MOISTURE CONTROL

#### 3.5.1 GENERAL:

The materials in each layer of the fill shall contain the amount of moisture, within the limits specified below or as directed by the Contracting Officer, necessary to obtain the desired compaction as determined by the Contracting Officer. Material that is not within the specified limits after compaction shall be reworked, regardless of density.

#### 3.5.2 MOISTURE CONTROL FOR IMPERVIOUS FILL

a.) The moisture content after compaction shall be as uniform as practicable throughout any one layer of impervious fill materials. The moisture content after compaction shall be within the limits of 3 percentage points above optimum to 1 percentage point below optimum moisture content as determined by procedures set forth in ASTM D 698.

b.) Material that is too wet shall be spread on the embankment and permitted to dry, assisted by discing or harrowing, if necessary, until the moisture content is reduced to an amount within the specified limits. When the material is too dry, the Contractor will be required to sprinkle each layer of the fill. Harrowing, or other approved methods, will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in amount so that free water will not appear on the surface during or subsequent to rolling. Should too much water be added to any part of the fill, the rolling on that section of the embankment shall be delayed until the moisture content of the materials is reduced to an amount within the specified limits. If it is impracticable to obtain the specified moisture content by wetting or drying the material on the fill, the Contractor may be required to pre-wet or dry back the material at the source of excavation or in the borrow area.

c.) If, in the opinion of the Contracting Officer, the top or contact surfaces of a partial fill section become too dry to permit suitable bond between these surfaces and the additional fill to be placed thereon, the Contractor shall loosen the dried materials by scarifying or discing to such depths as may be directed by the Contracting Officer, shall dampen the loosened material to an acceptable moisture content, and shall compact this layer in accordance with the applicable requirements of paragraph COMPACTION OF IMPERVIOUS FILL.

#### 3.5.3 DRAINAGE FILL MATERIALS

The moisture content shall be controlled such that hauling, spreading, and

compacting equipment can operate with normal procedure. If, in the opinion of the Contracting Officer, the material is too wet or too dry to facilitate proper compaction, the drainage material shall be wetted or dried as required to insure proper moisture limits without contaminating or segregating the drainage fill.

#### 3.5.4 2A COARSE AGGREGATE

The moisture content after compaction shall be as uniform as practicable throughout any one layer of 2A material. The moisture content after compaction shall be within plus or minus 2 percent of optimum moisture content as determined by procedures set forth in ASTM D 698.

### 3.6 COMPACTION

#### 3.6.1 COMPACTION EQUIPMENT

##### 3.6.1.1 GENERAL

A sheepsfoot (non-vibratory tamping roller) shall be used on impervious fill material. A static smooth drum roller shall be used on the fine drainage fill materials. A vibratory smooth drum rollers shall be used to compact the coarse drainage fill and 2A coarse aggregate materials; however, since most of the coarse drainage fill and 2A materials will be placed in confined areas and within 3 feet of closure structure, small hand operated compaction equipment shall be used to compact these fills. Crawler tractors shall be used used to spread the various fills and to compact the rockfill materials. Manufacturers specifications for all compaction equipment shall be submitted to the Contracting Officer for approval prior to use on the site. In confined areas, where space prohibits the use of heavy compaction equipment, hand operated power tampers shall be used to compact impervious fill; and vibratory plate tampers shall be used to compact other fill materials.

##### 3.6.1.2 CRAWLER TRACTORS

Crawler tractors shall be used to spread the fill materials for the levee embankment. The tractors shall be operated at speeds not to exceed 3 miles per hour. The crawler tractor to spread and compact the rockfill material shall have a minimum weight of 40,000 pounds and exert a unit track pressure of at least 1150 pounds per square foot.

##### 3.6.1.3 TAMPING ROLLERS

A non-vibratory sheepsfoot (tamping roller) shall be used to compact the impervious fill materials. The length of each tamping foot from the outside surface of the drum shall be of sufficient length to penetrate at least 80% of the uncompacted lift thickness, but not more than 110% of the uncompacted lift thickness. If the use of the selected tamping roller causes shearing of the fill, laminations in the fill, or results in inadequate compaction, the Contracting Officer may direct that such roller be removed from the fill and that another appropriate tamping roller be used. The roller shall be operated at speeds not to exceed 3 miles per hour.

#### 3.6.1.4 SMOOTH-DRUM ROLLERS

Dual or single smooth-drum rollers shall be the self-propelled type weighing 15 tons. Wheels of the rollers shall be equipped with adjustable scrapes. The use of vibratory rollers is required for the 2A coarse aggregate materials. A static smooth drum roller shall be used on the fine drainage fill materials. The roller shall be operated at speeds not to exceed 1.5 miles per hour.

#### 3.6.1.5 SMALL HAND OPERATED COMPACTORS

a.) Power tampers shall be hand operated equipment capable of compacting material against walls and in corners adjacent to structures and utilities. The compactors shall be either an internal combustion or pneumatic activated tamper, or a vibratory compactor type. Tampers shall have sufficient weight and striking power to produce the specified compaction. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

b. Vibratory compactors operated by hand in confined areas shall utilize the oscillating cam principal and shall deliver an impact of not less than 2000 pounds at a rate of approximately 2000 impulses per minute. The character and efficiency of this equipment shall be subject to the approval of the Contracting Officer.

#### 3.6.1.6 SPRINKLING EQUIPMENT

Sprinkling equipment shall consist of tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable width of surface.

#### 3.6.1.7 MISCELLANEOUS EQUIPMENT

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, and other equipment shall be suitable for use in embankment construction and approved by the Contracting Officer.

#### 3.6.2 COMPACTION OF MATERIALS

##### 3.6.2.1 COMPACTION OF IMPERVIOUS FILL

After a layer of material has been placed and spread, it shall be harrowed if required to break up and blend the fill materials, unless harrowing is performed to obtain uniform moisture distribution. Harrowing shall be performed with a heavy disk plow, or other approved harrow, to the full depth of the layer. If one pass of the harrow does not accomplish the breaking up and blending of the materials, additional passes of the harrow may be required, but in no case will more than three passes of the harrow on any one layer be required for this purpose. When the moisture content and the condition of the layer are satisfactory, the lift shall be compacted with an approved compaction equipment traversing in a direction parallel to the axis of the levee. The impervious fill shall be compacted using a non-vibratory tamping roller. The impervious fill material shall

be compacted to a density of at least 98 percent of the laboratory maximum dry density in accordance with the requirements of ASTM D 698. However, even if field density test results show that the required densities can be obtained with less than 6 coverages by the compaction equipment, the Contractor shall still be required to compact the impervious fill with a minimum of 6 complete coverages. In confined areas where small hand power tampers are used to compact the fill, the fill shall be compacted to the specified dry density requirement. Placing, spreading, sprinkling, and compacting may be performed at the same time at different points along a section when there is sufficient area to permit these operations to proceed simultaneously. Compaction equipment shall be operated such that the strip being traversed by the roller shall overlap the rolled adjacent strip by not less than 1 foot.

#### 3.6.2.2 COMPACTION OF FINE DRAINAGE FILL

Fine drainage fill material shall be compacted by not less than four (4) complete coverages of a smooth drum static roller. In confined areas, fine drainage fill material shall be compacted with at least four (4) complete coverage with a vibratory plate tamper and as many additional coverages as necessary to achieve the same density obtained with heavy compaction equipment.

#### 3.6.2.3 COMPACTION OF COARSE DRAINAGE FILL

Since the coarse drainage fill will be placed in the confined area of the closure toe drain, the coarse drainage fill material shall be compacted with at least 6 complete coverage with a vibratory plate tamper.

#### 3.6.2.4 COMPACTION OF 2A COARSE AGGREGATE

The 2A coarse aggregate material shall be compacted by not less than four (4) complete coverages of a smooth drum vibratory roller, and as many additional coverages as may be required to achieve the specified density. The 2A material shall be compacted to a density of at least 95 percent of the laboratory maximum dry density in accordance with the requirements of ASTM D 698. In confined areas where small hand operated compaction equipment is used to compact the fill, the fill shall be compacted to the specified dry density requirement. As specified in Section 02548, there are different placement and compaction requirements for the 2A material placed beneath the pavement section; this 2A coarse aggregate material beneath the pavement section shall be placed and compacted to the requirements of Section 02548.

#### 3.6.2.5 COMPACTION OF ROCKFILL

The rockfill shall be compacted by not less than six (6) complete coverages of the specified crawler tractor. Each coverage of the tractor shall consist of sufficient trips to provide complete coverage of the area by the treads of the tractor. The tractor coverages specified shall be in addition to spreading operations. Compaction of rockfill placed below the water surface is not required.

#### 3.6.3 COMPACTION ADJACENT TO STRUCTURES, PIPES, AND UTILITIES

Heavy equipment for spreading and compacting fill shall not be operated within 3 feet of structures, pipes, or utilities. Material within 3 feet shall be compacted using power tampers specified in paragraph SMALL HAND OPERATED COMPACTORS. Backfill adjacent to any and all types of structures and pipes shall be placed and compacted to the appropriate densities for each material type, as specified herein. After the structure has been constructed and the concrete has been allowed to cure for 7 days, backfill shall be placed in such a manner that the structure will not be damaged by the placement and compaction operation. As far as practicable, backfill shall be placed and compacted evenly on each side of the structure or pipe to prevent eccentric loading and excessive stress which may damage the structure or pipe.

### 3.7 QUALITY CONTROL

#### 3.7.1 GENERAL

The Contractor shall establish and maintain quality control as required in SECTION 01451, CONTRACTOR QUALITY CONTROL (CQC) in the SPECIAL CLAUSES.

a.) In addition, the Contractor shall submit a bi-weekly summary report, on forms to be provided by the Contracting Officer, of all Quality Control testing performed on embankment materials for each two-week period that embankment material is placed. This report shall be submitted to the Contracting Officer no later than the fifth working day following the two-week period in which the testing is performed and shall include all test results. However, individual daily laboratory test results (compaction & classification) shall be furnished daily (with the daily reports) to the Contracting Officer within 48 hours after sampling.

b.) In compliance with the provisions of PART 2 and paragraphs MOISTURE CONTROL and COMPACTION, the Contractor shall be responsible for the gradation, moisture content, density of embankment materials to the extent indicated in the following paragraphs or as otherwise indicated in these specifications.

c.) Prior to construction, the Contractor shall perform and submit certified copies of classification, moisture content, and laboratory compaction test results of all materials proposed for use within the embankment for approval by the Contracting Officer. Any soils not meeting the required specifications will not be accepted as suitable for the subject embankment materials. The contractor shall certify that the materials and test results meet the requirements of the specifications. As specified in paragraph 2.2, if residual material is proposed for use as impervious fill, chemical contamination testing shall be performed on the residual material. The chemical test results shall be submitted with the other soil testing results for approval by the Contracting Officer.

d.) The Contractor shall furnish to the Contracting Officer the exact location for each field test performed and each sample taken for laboratory classification testing. The location shall include the

stationing, offset from centerline, and lift elevation. Each laboratory compaction test shall be numbered and shall include the location of where the sample was taken at the borrow source. Each field density test shall indicate the specific laboratory compaction test (moisture-density curve) used to establish the moisture content and density (percent compaction) requirements of the fill material. In addition, for QA testing performed by the Contracting Officer, the Contractor shall provide the location of where the sample or test was performed; the location shall include the stationing, offset from centerline, and lift elevation.

e.) At the completion of all embankment work, the Contractor shall furnish to the Contracting Officer a "Final Embankment QC Testing Report ." The report shall contain testing data and information on each type of material placed within the embankment. The report shall include copies of all test results, computations, field notes, and summary tables. The format for presenting the data shall be approved by the Contracting Office.

f.) This section of the specifications describes the requirements for the testing of materials used in the embankment. The minimum testing requirements as specified in the below paragraphs are shown in Table 02331-1 at the end of this section

### 3.7.2 LABORATORY COMPACTION TEST

Laboratory compaction testing shall be run to determine moisture-density curves for impervious, and 2A coarse aggregate materials intended for use within the embankment and backfill. Compaction tests shall be performed on materials obtained from off-site borrow or commercial sources for use in the embankment. Every attempt should be made by field personnel to perform the compaction tests on samples obtained from advanced exploration (at off-site borrow areas) as soon as possible after any new material is encountered at any source. In this manner, moisture-density curves of each type of soil should be available for reference for determining the optimum moisture and maximum density of materials prior to hauling to and compaction in the embankment, and moisture and density control of the embankment will not lag when a new type soil is used. Laboratory compaction testing for each material will be performed at the rate shown on Table 02331-1. Additional tests will be performed as necessary as variations occur at the borrow source. Compaction tests shall be performed in accordance with ASTM D 698, and, if necessary, corrected for oversize particles in accordance with ASTM D 4718. Classification testing will accompany each laboratory compaction test and shall consist of Atterberg limits, grain size determination (sieve and hydrometer analyses), moisture content, and specific gravity determination. These tests are described in ASTM D 4318, ASTM D 422, ASTM D 2216, and ASTM D 854, respectively. Atterberg limits will not be required for the 2A coarse aggregate material.

### 3.7.3 CLASSIFICATION TESTING

Classification testing of the embankment and backfill materials shall consist of testing specified in the following sub-paragraphs. Tests will be required more frequently when the test results indicate that the soil in

a particular area is of questionable or variable quality. Any soils not meeting the required specifications will not be accepted as suitable for the subject embankment fill. Soils that are in stockpiles established by the Contractor or in the embankment which do not meet the requirements of the specifications shall be removed and disposed of by the Contractor at no additional cost to the Government.

#### 3.7.3.1 IMPERVIOUS FILL

Classification testing shall include Atterberg limits, grain size determination (sieve and hydrometer analyses) and specific gravity. These tests are described in ASTM D 4318, ASTM D 422, and ASTM D 854, respectively. Each gradation sample shall be at least 75 pounds in weight.

Samples for classification testing shall be obtained from material placed in the fill after the material has been spread to its specified lift thickness. Classification testing shall be performed at the rate shown on Table 02331-1, unless otherwise directed by the Contracting Officer.

#### 3.7.3.2 DRAINAGE FILLS

Classification testing shall consist of grain size determination in accordance with ASTM C 136 and ASTM C 117. Samples for classification testing shall be obtained from material placed in the fill after the material has been spread to its specified lift thickness. Classification testing shall be performed at the rate shown on Table 02331-1, unless otherwise directed by the Contracting Officer. However, a minimum of one gradation test shall be performed per work location per production day on both the fine and coarse drainage fills, unless otherwise directed by the Contracting Officer.

#### 3.7.3.3 2A COARSE AGGREGATE

Classification testing shall consist of grain size determination in accordance with ASTM C 136 and ASTM C 117. Samples for classification testing shall be obtained from material placed in the fill after the material has been spread to its specified lift thickness. Classification testing shall be performed at the rate shown on Table 02331-1, unless otherwise directed by the Contracting Officer. However, a minimum of one gradation test shall be performed per work location per production day on the 2A materials, unless otherwise directed by the Contracting Officer. Additional testing requirements of the 2A materials are specified in Section 02548

#### 3.7.4 MOISTURE CONTENT TEST

##### 3.7.4.1 IMPERVIOUS FILL MATERIAL

Moisture content tests will be made on samples taken from the impervious fill material. Samples for moisture content testing shall be obtained from material placed in the fill after the material has been spread to its specified lift thickness and just prior to compaction. For the impervious fill material, water content determination shall be performed at the rate shown on Table 02331-1. Water content determinations shall be performed in accordance with ASTM D 2216. Additional moisture content testing shall be

performed with the field density testing as described in the below paragraph DENSITY TEST. Any necessary adjustments to the moisture content of the impervious shall be made in accordance with paragraph MOISTURE CONTROL FOR IMPERVIOUS FILL.

#### 3.7.4.2 2A COARSE AGGREGATE

Moisture content tests will be made on samples taken from the materials. Samples for moisture content testing shall be obtained from material placed in the fill after the material has been spread to its specified lift thickness and just prior to compaction. Water content determination shall be performed at the rate shown on Table 02331-1. Water content determinations shall be performed in accordance with ASTM D 2216. Additional moisture content testing shall be performed with the field density testing as described in the below paragraph DENSITY TEST.

#### 3.7.5 DENSITY TEST

The Contractor shall adequately control compaction operations by tests made in accordance with any of the following methods: AASTM D 1556, or ASTM D 2922 and ASTM D 3017 to insure placement of materials are within the limits of densities specified. When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted, if necessary, using the sand cone method as described in paragraph "Calibration" of ASTM D 2922. When using the methods described in ASTM D 2922, the moisture content shall be determined in accordance with ASTM D 3017. The calibration curves furnished with the moisture gauges shall be checked along with the density calibration checks as described in ASTM D 3017. One calibration check of both the density and moisture gauges shall be made at the beginning of the job, on the embankment and backfill materials. If ASTM D 2922 is used for field density control, there should be at least one test performed according to ASTM D 1556 per every 10 tests performed according to ASTM D 2922 for correlation of test results. If the material contains over 5% of particles 1.5 inches or larger, the 12 inch sand cone test shall be used. Unless otherwise directed, the sand cone field density tests should be performed by excavating through the uppermost layer of compacted material to the underlying lift. Where ASTM D 1556 is performed, the test hole shall be backfilled and compacted with similar material. Additional tests shall be required in areas where conditions are questionable or if a change in weather occurs, or as otherwise directed by the Contracting Officer. The Contractor shall furnish to the Contracting Officer the exact location of each field density test, which shall include the station, offset from centerline of the levee, and the elevation. Results of all tests shall be furnished to the Contracting Officer within 1 hour after sampling. Acceptance tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such test for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government. For all in-place embankment and backfill material, field density tests shall be performed at a rate shown on Table 02331-1.

#### 3.7.6 Rockfill Gradation Testing

In order to demonstrate compliance with the specified gradation

requirement, one gradation test shall be made on a sample, which is at least 15 tons in size, unless otherwise directed by the Contracting Officer. Gradation testing shall be performed in accordance with ASTM D 5519, Test Method A.

### 3.8 FINE DRAINAGE FILL

Materials to be used as fine drainage fill shall comply with the requirements of these specifications. Precautions must be used in the placement and spreading operations to prevent segregation and contamination of these materials. Continuous inspection shall be maintained during such operations and also during the wetting and compaction operation, and when, in the opinion of the Contracting Officer, the material appears to be excessively segregated or contaminated, additional gradation tests shall be performed to determine the deviation from the required gradations. If, in the opinion of the Contracting Officer, segregation or contamination has occurred to the extent that the performance of the material in relation to drainage or filtering functions may be adversely affected, the Contractor shall remove the unsatisfactory material and replace it with other material in such a way so that requirements are satisfied, all at no additional cost to the Government. Moisture control and compaction shall be in accordance with the appropriate paragraphs of these specifications.

TABLE 02331-1

## QUALITY CONTROL - MINIMUM TESTING REQUIREMENTS (RATES OF TESTING)

Materials	Laboratory Compaction Test	Classification Testing(2)	Moisture Content	Nuclear Density(2)	Sand Cone
Impervious	1/750 cy	1/500 cy	1/200 cy	1/200 sy per lift	1 for every 10 Nuclear test
Fine Drainage Fill		1/25 cy (3)		1/75 sy per lift <sup>3</sup>	1 for every 10 Nuclear test
Coarse Drainage Fill		1/25 cy (3)		1/75 sy per lift <sup>3</sup>	1 for every 10 Nuclear test
2A Coarse Aggregate	1/100 cy	1/75 cy	1/50 cy	1/75 sy per lift <sup>3</sup>	1 for every 10 Nuclear test

## Note:

(1) Laboratory compaction test (and classification testing as specified in paragraph "Laboratory Compaction Test") performed on materials at borrow sources or in stockpiles prior to placement.

(2) Classification testing, moisture contents, and nuclear and sand cone density tests performed on in-place materials.

(3) A minimum of one gradation test and one field density test shall be performed per work location per production day on the in-place materials, unless otherwise directed by the Contracting Officer.

(4) For 2A coarse aggregate materials, additional testing (beyond what is shown on the table) will be required as specified in SECTION 02548.

(5) Rockfill gradation testing not shown on table. See paragraph "Rockfill Gradation Testing" for testing requirements.

-- End of Section --

## SECTION 02456

STEEL H-PILES  
02/98

## 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 36/A 36M	(1997a) Carbon Structural Steel
ASTM C 109	Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50-mm Specimens)

## AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1998) Structural Welding Code - Steel
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## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Qualifications; G ED.

The Contractor shall submit documents demonstrating that the Geotechnical Engineer, Piling Subcontractor, and Vibration Professional meets the requirements of this specification.

## SD-02 Shop Drawings

Fabricated Additions; G ED.

The Contractor shall submit drawings demonstrating compliance of driving equipment and H-Piles with contract drawings. Drawings shall include shop and field fabrication details, pile points, and welding details. Detail drawings shall be submitted prior to ordering materials.

## SD-03 Product Data

Equipment; G ED.

Description of pile driving and vibration monitoring equipment to be employed in the work, 30 days prior to commencement of pile installations; including details of the pile hammer, power plant, leads, cushion material, and helmet (drive head), and pile points. In addition, any pile splice details shall also be submitted.

#### SD-05 Design Data

Wave Equation Analysis; G ED.

The Geotechnical Engineer, (see paragraph GEOTECHNICAL INSPECTION), shall perform a wave equation analysis of the pile driving system submitted for approval. This analysis shall include bearing graphs which show pile capacity, pile stresses, and hammer stroke versus blow count for the pile size, length, and batter. The wave equation analysis shall be submitted for approval at least 7 calendar days prior to commencement of test pile driving. In addition to the results of the analysis, the submittal shall contain a detailed list of all assumptions and input data used in the analysis, including a copy of the computer input and output.

#### SD-06 Test Reports

Surveys and Records; G ED.

Vibration and Settlement Monitoring and Vibration Damage Survey: The Contractor shall submit a complete report on the vibration and settlement monitoring within 14 days of completion of monitoring, including but not limited to, a description of the equipment, locations of monitoring points, complete monitoring data, analysis of data, and other observations made during testing. The report shall be prepared by or under the direct supervision of a licensed professional experienced in vibration monitoring.

The Contractor shall submit a pre-vibration survey of adjacent structures prior to driving of piles. The survey shall include locations of structures surveyed along with photographs of cracks and other observed structural distress prior to pile driving operations. The Contractor shall submit a complete Vibration Damage Survey report within 14 days following pile driving operations. The Vibration Damage Survey report shall include photographs of any damage to buildings or structures induced from pile driving vibrations along with repair recommendations.

Pile Driving Records; G ED.

The Contractor shall submit weekly a complete and accurate record of each driven pile. The pile driving record shall indicate the pile location (as driven), driven length, embedded length, batter, final elevations of tip and top, applicable pile point information, pile dimensions, number of splices and locations, blows required for each 1 foot of penetration throughout the entire length of the pile and per one inch for the final 6 inches of penetration, and the time of beginning and end of driving. The record shall include the type and size of the hammer used, the rate of operation, ram stroke, fluid pressure, and the type and dimensions of driving helmet, pile cushion, and cap block used. If determined by the

Contracting Officer that the ram stroke cannot be accurately determined by visual means, the Contractor shall provide electronic means to measure the ram stroke. Any unusual conditions encountered during pile installation shall be recorded and immediately reported to the Contracting officer.

Upon completion of the pile installation, all pertinent pile information, such as actual location and alignment, final tip and top elevation, pile dimensions, final blow count and final hammer blow rate, pile batter, and installation equipment, or other data required by the Contracting Officer, shall be shown on as-built drawings for this project.

#### SD-07 Certificates

Materials; G ED.

Certified copies of mill test reports for structural steel prior to commencement of pile installations.

### 1.3 QUALIFICATIONS

#### 1.3.1 Foundation Contractor

The Contractor shall submit for review the qualifications of the Foundation Contractor (specialty subcontractor) performing the work including at least 3 examples of similar projects performed by the Foundation Contractor. The Foundation Contractor specializing in the specified foundation system shall have at least 5 years experience installing the specified foundation system under similar subsurface and structural conditions.

#### 1.3.2 Geotechnical Engineer

The Contractor shall submit for review the qualifications of the geotechnical inspection personnel involved in recording and monitoring the pile installation as required by paragraph "GEOTECHNICAL INSPECTION".

#### 1.3.3 Vibration Professional

The Contractor shall submit for review the qualifications of the vibration professional involved in recording and monitoring of vibration levels as required by paragraph "VIBRATION MONITORING DURING DRIVEN PILE INSTALLATION". The vibration professional shall have at least 5 years experience monitoring similar installations.

### 1.4 GEOTECHNICAL INSPECTION

An independent licensed Professional Engineer with expertise in Geotechnical Engineering, hereinbefore and hereafter referred to as the Geotechnical Engineer, shall be paid for by the Contractor and shall be provided to perform wave equation analyses and to oversee the recording and monitoring of all pile installations. The Geotechnical Engineer shall have at least 5 years experience in driven pile installation and wave equation analysis. Any field technicians under the supervision of the Geotechnical Engineer for recording and monitoring data shall have at least 3 years experience in driven pile installation.

## 1.5 SCOPE OF WORK

Work to be performed consists of the following major items and all ancillary activities associated with them:

Install HP 14 X 73 H-piles driven to the required minimum tip elevation 515.0 and the required driving resistance at the locations shown on the drawings. (The Minimum Pile Tip Elevation is defined for purposes of this Specification as the elevation of the pile tip at which the required minimum penetration is achieved. If the pile tip elevation at which the specified driving resistance is met is higher than the Minimum Pile Tip Elevation listed on the drawings, the Contractor shall notify the Contracting Officer. The Contracting Officer shall within 2 working days notify the Contractor as to whether the pile is acceptable or rejected. A pile rejected in this circumstance shall be considered obstructed (see paragraph 3.1.9, Obstructions). The Contracting Officer shall have the option of directing that the pile be abandoned in-place or withdrawn and replaced with a new pile at a location as determined by the Contracting Officer.) The required driving resistance will be determined by the Contracting Officer based on evaluation of the Contractor's submitted wave equation analysis of the pile driving system and an independent wave equation analysis performed by the Contracting Officer. The intent of these specifications is to drive the piles to bedrock. The Contracting Officer reserves the right to add as necessary additional piles to those shown on the drawings. Monitoring of settlement and vibrations during pile installation operations for nearby structures to determine if unacceptable levels will be encountered is required. Vibration Damage Surveys of nearby structures shall be completed before and after driving operations.

The piles have an allowable structural compressive design load of 50 tons which requires driving the piles to an ultimate load of 150 tons.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Steel H-Piles

Piles shall be of sections, sizes, materials, and weights indicated. H-piles shall meet the theoretical dimensions and properties of HP 14 X 73.

Furnished pile lengths shall not be less than 45 feet. Pile tips as driven shall be square and blunt as received from the mill. Pile tip reinforcements or cast steel points are required to obtain the required penetration. Steel H piles shall conform to the requirements of ASTM A 36/A 36M. Pile tip reinforcements or cast steel points are required to obtain the required penetration. Steel for pile points shall conform to the requirements of ASTM A 27 65/35 heat treated cast steel. The following premanufactured H-pile points may be used, providing the points are not prebeveled.

1. APF HP 7570
2. Versabite H-pile Tip

### 3. DFP 757

#### 2.1.2 Cement Grout

Grout tests shall be conducted in accordance with ASTM C 109 in a laboratory approved by the Contracting Officer. Test specimens shall be prepared by pouring grout into 2-inch by 2-inch by 2-inch cube molds. Not less than 9 molds shall be cast during each 8-hour shift. Three cubes shall be tested at 7 days; three at 28 days; and three at 90 days. Cement Grout is required to fill the void between the H-pile and the surrounding soil following driving operations. Cement Grout shall have a minimum 28-day compressive strength of 4,000 psi (f'c). Testing shall be the responsibility of the contractor.

#### 2.2 EQUIPMENT

##### 2.2.1 Hydraulic Pile Hammer

The required hammer shall be hydraulically operated and shall have performance characteristics appropriate for the pile type, total weight of the pile, batter, and dimensions, the characteristics of subsurface material to be encountered, and the pile capacity to be developed. The driving energy of the hammer shall be not less than 25,000 foot-pounds.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 Pile Driving

Piles shall be driven to or below the "Minimum" tip elevation to reach a required driving resistance. The "Minimum" Pile Tip Elevation is elevation 515.0 feet. A new pile cushion shall be used at the start of driving for the first pile and the cushion shall be replaced whenever it has become highly compressed, charred, burned, or deteriorated in any manner during driving, or if it compresses to a thickness less than 60 percent of the original height. Each pile shall be driven continuously and without interruption until the required depth of penetration and penetration rate per blow have been attained. If a pile fails to reach the "Minimum" tip elevation or if a pile reaches the "Minimum" tip elevation without reaching the required driving resistance, the Contractor shall notify the Contracting Officer within 24 hours and perform directed corrective measures. If the pile tip elevation at which the specified driving resistance is met is higher than the "Minimum" Pile Tip Elevation specified, the Contracting Officer will determine whether the pile is acceptable or rejected. A pile rejected in this circumstance shall be considered obstructed (see paragraph Obstructions).

##### 3.1.2 Pile Driving Stroke Limits

All piles shall be driven with a starting stroke of 1 foot and only gradually increased as long as the particle velocities and settlements are less than the limits described below. The stroke shall be limited to a

level such that the maximum particle velocity, measured on the nearby wall, is less than 1 inch/second and that no settlement of the wall occurs.

### 3.1.3 Jetting of Piles

Jetting of piles will not be permitted.

### 3.1.4 Pile Alignment During Driving

Piles shall be handled and driven carefully to prevent overstress or leaning from a true position. The pile-driving rig shall have sufficiently rigid supports so that the leads remain accurately aligned. Templates or guide frames shall be erected at or close to the ground surface.

### 3.1.5 Splices

In general, splices will not be allowed. However, if for some unforeseen reason splices are needed, they must be authorized by the Contracting Officer. When authorized by the Contracting Officer, splices shall be of the full penetration butt-weld type using a back-up bar, gap and beveled top section. Unless otherwise authorized by the Contracting Officer, only one splice will be permitted per length of pile. Splices shall be designed and constructed to maintain the true alignment and position of the pile sections. Splices shall develop the full strength of the pile in both bearing and bending. The bottom section of the H-pile shall be beveled for purposes of welding. Proprietary prefabricated splicer sleeves may be used upon prior approval by the Contracting Officer. The following pre-manufactured H-pile splices may be used provided that the flanges are connected by a full penetration butt weld:

1. APF HP 3000
2. Versabite Splicer Sleeve
3. DFP HP 300

### 3.1.6 Welding

Shop and field welding, qualification of welding procedures, welders, and welding operators shall be in accordance with AWS D1.1.

### 3.1.7 Tolerances in Driving

Piles shall be accurately placed in the correct horizontal location and vertical alignment as shown on the contract drawings. Top of pile (pile head) at elevation of cut off shall be within 4 inches of the location indicated. Additionally, a variation in batter, as measured on the driven pile, of not more than 1/4 inch per foot of longitudinal axis will be permitted. Manipulation of piles to force them into position will not be permitted. Piles damaged or driven outside the above tolerances shall be replaced or additional piles driven at locations specified by the Contracting Officer at no expense to the Government. Piles shall be surveyed by a licensed Surveyor or Engineer, both prior to installation and after installation to determine that required tolerances for horizontal

location and heave are met. After the first pile in each group of three or more piles has been installed, the pile head elevation shall be surveyed. After all piles in the group have been installed, the first pile driven shall be checked for heave. If more than 1/4 inch heave is measured, all piles in the group shall be redriven to the required driving resistance. The Contractor shall not be entitled to extra compensation for redriving to correct heave.

#### 3.1.8 Cutting of Piles

Piles shall be cut off at the elevations indicated with an acetylene torch, saw or by a method approved by the Contracting Officer. Cut-off elevations shall be within 1 inch of that specified.

#### 3.1.9 Obstructions

Obstructions preventing pile penetration shall be removed if directed by the Contracting Officer. If in the judgment of the Contracting Officer, removal of the obstruction is not feasible, the pile shall be withdrawn or left in place as directed by the Contracting Officer. Rejected piles left in place shall be cut off a minimum 24 inches below the bottom of pile cap.

Rejected piles due to obstructions shall be replaced by one or more piles as directed by the Contracting Officer. The Contractor shall be paid for the rejected pile and replacement piles according to the Unit Price Item "Steel H-Piles - Pile Lengths" of Section 01270.

#### 3.1.10 Additional Piles

The Contracting Officer may direct that additional piles be installed in locations not shown on the plans. Payment for furnishing and installing additional piles shall be according to the Unit Price Item, "Steel H-Piles - Pile Lengths" of Section 01270.

#### 3.1.11 Excavation and Backfilling

All excavation and backfilling including dewatering and sheeting and shoring shall be performed in accordance with the applicable paragraphs in specification section 02331 Levee Embankment Construction and Backfilling of Closure Structure.

### 3.2 PRODUCTION PILES

#### 3.2.1 Installation

Reference paragraph "INSTALLATION" for installation requirements.

#### 3.2.2 Lengths

The estimated quantities of piles listed in the unit price schedule are given for bidding purposes only. The Contractor will determine the actual lengths of piles required to be driven below cut-off elevation for the various locations in the work. No payment shall be made by the government for pile lengths above the cut-off elevation. Prior to driving, the bottom 20 feet of piles shall be marked in 1-foot increments except that the top 5

feet shall be marked off in 1-inch increments to assist in measuring the pile penetration per blow.

### 3.2.3 Driving

No piling shall be driven within 25 feet of concrete which is less than 7 days old unless otherwise authorized by the Contracting Officer. A complete and accurate record of the driving of piles shall be compiled by the Geotechnical Engineer paid for by the Contractor for submission to the Contracting Officer within 24 hours of completion of driving. This record shall include pile batter and any other pertinent information required by the Contracting Officer. When driving long piles of high slenderness-ratio, special precautions shall be taken to insure against overstressing and leading away from a plumb or true position. During driving, pile driving hammers shall be operated at all times at the speed and conditions recommended by the hammer manufacturer unless otherwise specified. Each pile shall be driven continuously and without interruption until the required minimum tip elevation and penetration resistance have been attained. Deviation from this procedure will be permitted only in case the driving is stopped by causes which reasonably could not have been anticipated. A pile which has not reached the required penetration resistance when the top has been driven to the cut-off elevation shall be spliced as specified and driven to a depth sufficient to develop the required penetration resistance. A pile which cannot be driven to the required depth because of an obstruction shall be cut-off and abandoned, as directed by the Contracting Officer. When driving piles in clusters, or under conditions of relatively close spacing, observations shall be made to determine uplift (heave). The Contractor shall control his driving sequence to minimize pile uplift. Uplifted piles shall be back-driven to the original blow count resistance and at least to the previously driven tip elevation, without additional cost to the Government. Piles which are damaged as a result of driving shall be cutoff and abandoned and additional piles driven, as directed by the Contracting Officer and without additional cost to the Government. The Contracting Officer may require that any pile be withdrawn for inspection. Piles withdrawn at the request of the Contracting Officer and found to be in suitable condition shall be redriven and those found not suitable shall be replaced by new piles. After piles are driven, they shall be cut off square at the indicated cut-off elevations.

### 3.2.4 Pile Cap Formwork

Prior to obtaining approval for proceeding with pile cap formwork, as-built drawings prepared by the Surveyor, showing the actual driven locations of piles, shall be submitted by the Contractor to the Contracting Officer. The Government will make an analysis of conditions at each pile cap location and will make a determination of corrective measures required, if any.

### 3.2.5 Final Disposition of Piles

Any damaged or rejected piles approved by the Contracting Officer to be left in place shall be cut off at an elevation 2 feet below the bottom of any new work as shown on the drawings and the area backfilled in accordance

with Specification Section 02331 Levee Embankment Construction and Backfilling of Closure Structure, unless otherwise directed by the Contracting Officer.

### 3.3 VIBRATION AND SETTLEMENT MONITORING DURING DRIVEN PILE INSTALLATION

#### 3.3.1 General

The Contractor shall monitor his installation operations for vibration and settlement so as to determine vibration levels and any movement of the nearby wall during installation of driven piles. A series of vibration level and settlement measurements shall be made at locations on the adjacent wall. The vibrations and settlements shall be measured in terms of the peak particle velocity of the ground and settlement of the wall respectively at locations approved by the Contracting Officer. Ambient vibration levels shall also be recorded. Continuous readings shall be taken during driving of all piles located within 25 feet of the existing wall and to a driving depth of 15 feet. Frequency of readings may be reduced for driving piles to greater depths or for piles located at a distance greater than 25 feet if measured particle velocities are decreasing and as approved by the Contracting Officer.

#### 3.3.2 Vibration Professional

The Contractor shall retain a qualified and recognized vibration professional specializing in monitoring and interpreting ground vibrations.

The professional shall be present during the installation of the driven piles. The professional shall certify in writing all readings and interpretations and the correction of any errors. The professional shall participate in meetings requested by the Contracting Officer through the Contractor involving interpretation of records, changes to installation procedures to reduce vibrations, and location of monitoring sites. In addition, the professional shall be responsible for, but not limited to, the following items of work: on-site recording of vibration levels at adjacent structures; keeping accurate records; submitting reports as required herein; analyzing vibration waveforms for determining peak particle velocities (displacements or accelerations) and waveforms frequency characteristics. The professional shall be required to maintain or obtain accurate records of the following items of work: plan showing location of monitoring points; height of hammer drop; weight of hammer; and any other information that the professional deems necessary. The labor, equipment, and materials required to perform the vibration level monitoring shall be considered a subsidiary operation and no separate payment shall be made for vibration level monitoring as required herein.

#### 3.3.3 Vibration Monitoring

##### 3.3.3 General

The Contractor shall furnish a vibration professional and all materials, labor, equipment, tools, and any incidentals needed for the construction, installation, maintenance, and protection of the following instrumentation work complete and installed. The instrumentation shall include (but not be limited to): Portable vibration sensors, Recorder and Air Blast Sensor.

### 3.3.4 Vibration Seismograph

An accurate measurement of the vibrations induced by driven pile installation operations is required. The vibration seismograph must have a wide range of sensitivities (wide dynamic range) and a broad-band frequency response. The vibration seismograph shall be portable, rugged, reliable, and have the capacity to measure at least three components (vertical, radial, and transverse) of ground motion simultaneously. The vibration seismograph shall have a flat frequency response over a frequency range of approximately 2 to 200 Hz or better. The vibration seismograph shall be capable of recording the full vibration waveform so that a permanent record may be kept for subsequent detailed analysis. The vibration seismograph shall be capable of displaying or determining peak particle velocities and peak air overpressures associated with an event immediately after occurrence. The vibration seismograph shall be capable of recording a fourth component of ground motion so that a single geophone may be located immediately adjacent to the installation site. A second vibration seismograph may be substituted for a fourth channel capability so that relationships between waveform decay versus distance may be made. Sufficient cable shall be provided to allow the sensors to be placed at any location in the work area. The location of the sensors shall be as directed by the vibration professional and as approved by the Contracting Officer. The vibration seismograph shall be supplied by the vibration professional. The vibration seismograph shall be considered a subsidiary operation of vibration monitoring and no separate payment shall be made for supplying the labor, equipment, and materials as required herein.

### 3.3.5 Vibration Monitoring

A series of vibration monitoring tests shall be performed during the entire duration of driven pile installations. These tests shall measure vibrations at the same time both at the source and at adjacent structures. Sufficient tests shall be performed to correlate attenuation of vibrations with distance from the source to the adjacent structures. A minimum of 3 points per building or structure shall be monitored during all pile driving operations. The monitoring and interpreting of the monitoring records shall be performed by a qualified vibration professional hired by the Contractor. One copy of the vibration records and a brief report containing interpretation of these records and the resultant conclusions and recommendations shall be furnished to the Contracting Officer within 3 days after completion of the driven pile installations. The labor, equipment, and materials required to perform the vibration monitoring shall be considered a subsidiary operation and no separate payment shall be made for vibration monitoring as required herein.

#### 3.3.3.4 Certified Vibration Report

Within 14 days after installation of the driven piles, a final report shall be submitted to the Contracting Officer. This report shall describe, locate, and illustrate the vibration monitoring program. The report shall also discuss the results of the monitoring program and shall state conclusions regarding the vibrations induced by the driven pile installations. Particular attention shall be directed to the relationship

between the energy (in foot-pounds) delivered by the both pile hammer, resulting ground vibrations, and dissipation of vibrations with distance. All pertinent data collected in the monitoring program shall be summarized and tabulated in the report. Typical waveforms shall also be presented. The report shall have the signature and seal of the vibration professional.

The labor, equipment, and materials required to perform all the work necessary to complete the final report shall be considered a subsidiary operation of the vibration monitoring and no separate payment shall be made for completion of the report. Three copies of the certified vibration report shall be given to the Contracting Officer.

#### 3.3.6 Settlement Monitoring

The contractor shall establish independent survey points on the existing wall at locations approved by the Contracting Officer. The contractor shall use these points to monitor for vertical movement of the wall with a surveying accuracy of plus or minus 1/16 inch. Readings shall be taken at the same frequency as peak particle velocity. Results of the surveys shall be presented to the Contracting Officer within 24 hours. If any movement of the wall occurs, the Contractor shall stop pile driving and notify the Contracting Officer immediately.

-- End of Section --

## SECTION 02457

STEEL SHEET PILES  
09/99

## 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 the basic designation only.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A6/A6M (1997) General Requirements for Rolled Steel Plates, Slopes, Sheet Piling, and Bars for Structural Use.

## AMERICAN WELDING SOCIETY, INC. (AWS)

AWS D1.1 (2002) Structural Welding Code - Steel

## 1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

## SD-02 Shop Drawings

Steel sheet piles; G ED

Submit drawings for approval prior to start of the work or ordering materials. Include details of top protection, special reinforcing tips, tip protection, lagging, splices, fabricated additions to plain piles and driving, cut-off method, and corrosion protection. Drawings for sheet piling including fabricated sections shall show complete dimensions including minimum section properties and details of piling and the driving sequence and location of piling. Include details and dimensions of templates and other temporary guide structures for installing the piling. Provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

## SD-07 Certificates; G AR

Pile pulling method; G AR

Material certificates; G AR

Pile driving equipment; G AR

Certified Vibration Report; G AR

Submit three copies of certified vibration report as specified.

SD-09 Reports

Pre-installation Survey Report

SD-11 Closeout Submittals

Pile driving record

Post-installation Survey Report

### 1.3 DELIVERY AND STORAGE

Handle piling using handling holes or lifting devices. Handling holes shall be located within 6 inches from top of piling. Handle long length piles with care to prevent damage. Support on level blocks or racks spaced not more than 10 feet apart and not more than 2 feet from the ends. Supports between multiple lifts shall be in a vertical plane. Protect piling to prevent damage to coatings and to prevent corrosion prior to installation.

### 1.4 QUALITY ASSURANCE

#### 1.4.1 Material Certificates

Submit for each shipment certificates and identified with specific lots prior to installing piling. Identification data should include piling type, dimensions, chemical composition, mechanical properties, section properties, heat number, and mill identification mark. Material test reports shall meet the requirements of ASTM A6/A6M.

### 1.5 EQUIPMENT

#### 1.5.1 Pile Driving Equipment

The required hammer shall be hydraulically operated and shall have performance characteristics appropriate for the pile type, total weight of the pile, batter, and dimensions, the characteristics of subsurface material to be encountered, and the pile capacity to be developed. The driving energy of the hammer shall be not less than 25,000 foot-pounds. Submit descriptions of pile driving equipment to be employed in the work to the Contracting Officer for approval. Descriptive information includes manufacturer's name, model numbers, capacity, rated energy, hammer details, cushion material, helmet, templates and complete record of maintenance.

## PART 2 PRODUCTS

### 2.1 STEEL SHEET PILES

Sheet piling shall be new, hot-rolled, Type PZ-22, conforming to ASTM A572, Grade 50 or shall be new, cold-formed sheet piling conforming to all of the

following requirements:

- Depth of sheet less than or equal to 9"
- Section Modulus greater than 18 cubic inches per linear foot of wall
- Conform to ASTM A572, Grade 50
- Tested in accordance with ASTM A6 prior to forming sheets

### PART 3 EXECUTION

#### 3.1 EARTHWORK

Perform in accordance with Sections 02329, STRIPPING AND EXCAVATION FOR EMBANKMENTS AND CLOSURE STRUCTURE and 02331, LEVEE EMBANKMENT CONSTRUCTION AND BACKFILLING FOR CLOSURE STRUCTURE. Pre-excavation will be permitted only as indicated on the drawings. Backfill as indicated.

#### 3.2 INSTALLATION

##### 3.2.1 Pile Driving Stroke Limits

All piles shall be driven with a starting stroke of 1 foot and only gradually increased as long as the particle velocities and settlements are less than the limits described below. The stroke shall be limited to a level such that the maximum particle velocity, measured on the nearby wall, is less than 1 inch/second and that no settlement of the wall occurs.

##### 3.2.2 Pile Protection

Use a protecting cap during driving, as required, to prevent damage to the top of the sheet piling. Use cast steel shoe, as required, to prevent damage to the tip of the sheet piling.

##### 3.2.3 Templates

Prior to driving, provide template or driving frame suitable for aligning, supporting, and maintaining sheet piling in the correct position during setting and driving. Use a system of structural framing sufficiently rigid to resist lateral and driving forces and to adequately support the sheet piling until design tip elevation is achieved. Provide at least two levels of support, not less than 1/2 the length of piling apart. Templates shall not move when supporting sheet piling. Fit templates with wood blocking to bear against the web of each alternate sheet pile and hold the sheet pile at the design location alignment. Provide outer template straps or other restraints as necessary to prevent the sheets from warping or wandering from the alignment. Mark template for the location of the leading edge of each alternate sheet pile. If in view, also mark the second level to assure that the piles are vertical and in position. If two guide marks cannot be seen, other means must be used to keep the sheet pile vertical along its leading edge.

##### 3.2.4 Pile Driving

Maintain piling vertical during driving. Drive piles in such a manner as

to prevent damage to the piles and to provide a continuous interlocked floodwall. Where possible, drive Z-pile with the ball end leading. If an open socket is leading, a bolt or similar object placed in the bottom of the interlock will minimize packing material into it and ease driving for the next sheet. Incrementally sequence driving of individual piles such that the tip of any sheet pile shall not be more than 4 feet below that of any adjacent sheet pile.

#### 3.2.5 Jetting of Piles

Jetting will not be permitted.

#### 3.2.6 Pre-Augering or Spudding of Piles

Pre-augering or spudding of piles will not be permitted.

#### 3.2.7 Cutting and Splicing

Splicing of piles will not be allowed unless directed by the Contracting Officer. Pile cut-offs shall become the property of the Contractor and shall be removed from the site. Use a straight edge in cutting by burning to avoid abrupt nicks. Bolt holes shall be drilled or may be burned and reamed by approved methods which will not damage the surrounding metal.

#### 3.2.8 Welding

Shop and field welding, qualification of welding procedures, welders, and welding operators shall be in accordance with AWS D1.1.

#### 3.2.9 Tolerances in Driving

Piles shall be driven such that top of pile shall be within elevation specified plus or minus 0.1 foot. After a template-length reach of piling is driven, a stringline shall be held above the top of piling, at the exact centerline of Contract alignment, and a plumb-bob shall be held at a 90 degree offset to the stringline at a distance equal to 1/2 the nominal depth of sheet piling plus 1 inch. This shall be performed at the landside and riverside flanges of every sheet. If the plumb-bob touches any portion of the piling above grade, the piling shall be considered out of tolerance and shall be pulled and redriven until corrected. Piles shall also be considered out of tolerance if the vertical out-of-plumbness in the plane of the wall exceeds 1/8 inch per foot. Manipulation of piles to bend, deflect or force them into compliance will not be permitted. Other piles may need to be pulled and redriven as required to correct the pile that is out of tolerance. Piles shall be free from external support, templates or bracing while being checked for tolerance compliance. Results of tolerance check shall be documented and given to the Contracting Officer for approval. Approval is required before template can be removed and additional sheets driven. If the Contractor is not able to demonstrate and maintain these tolerances at any time, the Contracting Officer reserves the right to direct the use of additional or reinforced templates, changes in the driving energy or methods, and other revisions which will ensure compliance. Such measures shall be provided promptly, and without additional cost to the Government.

### 3.3 INSPECTION

Perform continuous inspection during pile driving. Inspect all piles for compliance with tolerance requirements. Bring any problems which may occur to the attention of the Contracting Officer. Correct all problems prior to advancing template. The Contractor shall need the Contracting Officer's approval prior to advancing template.

#### 3.3.1 Inspection of Driven Piling

The Contractor shall inspect the interlocks of the portion of driven piles that extend above ground. Remove and replace piles found to be out of interlock. Elevation, plumbness, and alignment of each piling shall be checked and documented by the Contractor immediately after installation in accordance with Paragraph: Tolerances in Driving.

#### 3.3.2 Pulling and Redriving

The Contractor may be required to pull selected piles after driving to determine the condition of the underground portions of piles. The pile pulling method must be approved by the Contracting Officer. Remove and replace at the Contractor's expense any pile pulled and found to be damaged to the extent that its usefulness in the structure is impaired. Redrive piles pulled and found to be in satisfactory condition.

### 3.4 INSTALLATION RECORDS

Maintain a pile driving record for each sheet pile. Indicate on the installation record installation dates and times, type and size of driver, rate of operation, pile locations, tip elevations, ground elevations, results of tolerance check, and any reheading or cutting of piles. Record any driving or tolerance problems. Submit complete records to the Contracting Officer.

### 3.5 VIBRATION AND SETTLEMENT MONITORING DURING DRIVEN PILE INSTALLATION

#### 3.5.1 General

The Contractor shall monitor his installation operations for vibration and settlement so as to determine vibration levels and any movement of the nearby wall during installation of driven piles. A series of vibration level and settlement measurements shall be made at locations on the adjacent wall. The vibrations and settlements shall be measured in terms of the peak particle velocity of the ground and settlement of the wall respectively at locations approved by the Contracting Officer. Ambient vibration levels shall also be recorded. Continuous readings shall be taken during driving of all piles located within 25 feet of the existing wall and to a driving depth of 15 feet. Frequency of readings may be reduced for driving piles to greater depths or for piles located at a distance greater than 25 feet if measured particle velocities are decreasing and as approved by the Contracting Officer.

#### 3.5.2 Vibration Professional

The Contractor shall retain a qualified and recognized vibration professional specializing in monitoring and interpreting ground vibrations.

The professional shall be present during the installation of the driven piles. The professional shall certify in writing all readings and interpretations and the correction of any errors. The professional shall participate in meetings requested by the Contracting Officer through the Contractor involving interpretation of records, changes to installation procedures to reduce vibrations, and location of monitoring sites. In addition, the professional shall be responsible for, but not limited to, the following items of work: on-site recording of vibration levels at adjacent structures; keeping accurate records; submitting reports as required herein; analyzing vibration waveforms for determining peak particle velocities (displacements or accelerations) and waveforms frequency characteristics. The professional shall be required to maintain or obtain accurate records of the following items of work: plan showing location of monitoring points; height of hammer drop; weight of hammer; and any other information that the professional deems necessary. The labor, equipment, and materials required to perform the vibration level monitoring shall be considered a subsidiary operation and no separate payment shall be made for vibration level monitoring as required herein.

### 3.5.3 Vibration Monitoring

#### 3.5.3.1 General

The Contractor shall furnish a vibration professional and all materials, labor, equipment, tools, and any incidentals needed for the construction, installation, maintenance, and protection of the following instrumentation work complete and installed. The instrumentation shall include (but not be limited to): Portable vibration sensors, Recorder and Air Blast Sensor.

#### 3.5.3.2 Vibration Seismograph

An accurate measurement of the vibrations induced by driven pile installation operations is required. The vibration seismograph must have a wide range of sensitivities (wide dynamic range) and a broad-band frequency response. The vibration seismograph shall be portable, rugged, reliable, and have the capacity to measure at least three components (vertical, radial, and transverse) of ground motion simultaneously. The vibration seismograph shall have a flat frequency response over a frequency range of approximately 2 to 200 Hz or better. The vibration seismograph shall be capable of recording the full vibration waveform so that a permanent record may be kept for subsequent detailed analysis. The vibration seismograph shall be capable of displaying or determining peak particle velocities and peak air overpressures associated with an event immediately after occurrence. The vibration seismograph shall be capable of recording a fourth component of ground motion so that a single geophone may be located immediately adjacent to the installation site. A second vibration seismograph may be substituted for a fourth channel capability so that relationships between waveform decay versus distance may be made. Sufficient cable shall be provided to allow the sensors to be placed at any location in the work area. The location of the sensors shall be as directed by the vibration professional and as approved by the Contracting

Officer. The vibration seismograph shall be supplied by the vibration professional. The vibration seismograph shall be considered a subsidiary operation of vibration monitoring and no separate payment shall be made for supplying the labor, equipment, and materials as required herein.

#### 3.5.3.3 Vibration Monitoring

A series of vibration monitoring tests shall be performed during the entire duration of driven pile installations. These tests shall measure vibrations at the same time both at the source and at adjacent structures. Sufficient tests shall be performed to correlate attenuation of vibrations with distance from the source to the adjacent structures. A minimum of 3 points per building or structure shall be monitored during all pile driving operations. The monitoring and interpreting of the monitoring records shall be performed by a qualified vibration professional hired by the Contractor. One copy of the vibration records and a brief report containing interpretation of these records and the resultant conclusions and recommendations shall be furnished to the Contracting Officer within 3 days after completion of the driven pile installations. The labor, equipment, and materials required to perform the vibration monitoring shall be considered a subsidiary operation and no separate payment shall be made for vibration monitoring as required herein.

#### 3.5.3.4 Certified Vibration Report

Within 14 days after installation of the driven piles, a final report shall be submitted to the Contracting Officer. This report shall describe, locate, and illustrate the vibration monitoring program. The report shall also discuss the results of the monitoring program and shall state conclusions regarding the vibrations induced by the driven pile installations. Particular attention shall be directed to the relationship between the energy (in foot-pounds) delivered by the both pile hammer, resulting ground vibrations, and dissipation of vibrations with distance. All pertinent data collected in the monitoring program shall be summarized and tabulated in the report. Typical waveforms shall also be presented. The report shall have the signature and seal of the vibration professional.

The labor, equipment, and materials required to perform all the work necessary to complete the final report shall be considered a subsidiary operation of the vibration monitoring and no separate payment shall be made for completion of the report. Three copies of the certified vibration report shall be given to the Contracting Officer.

#### 3.5.4 Settlement Monitoring

The contractor shall establish independent survey points on the existing wall at locations approved by the Contracting Officer. The contractor shall use these points to monitor for vertical movement of the wall with a surveying accuracy of plus or minus 1/16 inch. Readings shall be taken at the same frequency as peak particle velocity. Results of the surveys shall be presented to the Contracting Officer within 24 hours. If any movement of the wall occurs, the Contractor shall stop pile driving and notify the Contracting Officer immediately.

-- End of Section --



## SECTION 02548

## BITUMINOUS PAVING

## PART 1 GENERAL

## 1.1 Applicable Publication

Commonwealth of Pennsylvania, Department of Transportation Specifications, 2000, and addendum thereto, referred to herein as PADOT specifications.

## 1.2 Definitions

Reference to "Engineer" shall be interpreted to mean "Contracting Officer."

## 1.3 Measurement and Payment

Delete all references to MEASUREMENT and PAYMENT paragraphs.

## 1.4 Testing

All testing shall be done by an independent commercial testing laboratory at the Contractor's expense and responsibility.

## 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-05 Design Data

Asphalt Mix Design; G ED.

Copies of Job mix formula test results and reports 30 days prior to use on the project.

## SD-06 Test Reports

Density Testing

Plant Control; G AR

## SD-07 Certificates

Prime Coat

Tack Coat

## PART 2 MATERIALS

## 2.1 Bituminous Surface Course

The surface course shall conform to the requirements of Section 420, Bituminous Wearing Course, ID-2 Standard of the PADOT specifications, except as modified herein. "Wearing course" shall be construed to mean "surface course."

## 2.2 Bituminous Concrete Base Course:

The concrete base course shall conform to the requirements of Section 305, Bituminous Concrete Base Course, of the PADOT specifications, except as modified herein.

## 2.3 Composition of Mixtures - Item 401.2(d)

The establishment of the job-mix formula and the plant control shall be performed by an independent recognized commercial testing laboratory at the Contractor's expense and responsibility. The finished mixture shall meet all of the PennDOT requirements for the specified mix including those for stability, flow, percentage of unfilled voids and percent VMA when tested in accordance with the PennDOT specifications.

The Contractor shall submit the mix design accompanied by test results attesting that the materials and properties selected shall produce a mixture of the specified qualities.

## 2.4 Plant Control

The plant control, including the establishment of the actual mixing temperature, shall be performed by an independent recognized commercial testing laboratory at the Contractor's expense and responsibility. Hot-bin gradations shall be performed at a minimum of two-hour intervals and the composite gradation shall be calculated from the gradation of each hot bin.

Based on these analyses, suitable adjustments shall be made to conform to the approved job-mix formula. A minimum of three Marshall specimens shall be molded per 1500 square yards of material placed or fraction thereof. Marshall tests of the specimens shall be performed in accordance with the PennDOT specifications, and the results furnished the Contracting Officer 24 hours after completion of the testing.

## 2.5 Aggregate Base Course

Aggregate Base Course shall be 2A GRANULAR BASE COURSE and shall conform to the requirements of Section 350, SUBBASE. Material shall be Type B or better and conform to gradation No. 2A, as specified in Tables B and C of Section 703.2 Coarse Aggregate of the Pennsylvania Specifications. The Contractor shall submit to the Contracting Officer the results of gradation, liquid limit, plasticity index, wear, soundness, and laboratory moisture-density curves for each source of base course material. A minimum of one in-place density tests shall be performed per 1000 square yards or fraction thereof and the test results submitted to the Contracting Officer.

## PART 3 EXECUTION

## 3.1 Earthwork and Subgrade Preparation

Earthwork and Subgrade Preparation shall conform to SECTION 02331 Levee Embankment Construction and Backfilling for Closure Structures.

### 3.2 Aggregate Base Course

Aggregate base course shall conform to the requirements indicated in PART 2 of this specification.

### 3.3 Surface Preparation - Item 401.3(f)

#### 3.3.1 Prime Coat

A prime coat meeting the requirements of Section 461 shall be applied to all areas indicated on the drawings or directed by the Contracting Officer.

Application rates shall range from 0.20 to 0.50 gallon per square yard. The actual application rate shall be determined by the Contracting Officer from the results of a trial strip. The prime coat shall be permitted to cure for a period of 48 hours or longer, as required by the Contracting Officer. The primed surface shall not be left uncovered long enough to permit it to lose its tackiness.

#### 3.3.2 Tack Coat

A tack coat meeting the requirements of Section 460 shall be applied to all areas indicated on the drawings or directed by the Contracting Officer.

Surfaces to receive a tack coat shall be free of excess dust and other loose material. The emulsified asphalt tack coat shall be applied at such a rate as to leave a uniform asphalt residue from 0.02 to 0.07 gallons per square yard on the treated surface. Submit a certificate to the Contracting Officer indicating the asphalt residue content of the material being used. The actual application rate shall be determined by the Contracting Officer from the results of a trial strip. Work shall be planned so that no more tack coat than is necessary for the day's operation is placed on the surface. The tack coat shall be permitted to cure until the proper degree of tackiness, as determined by the Contracting Officer, has been obtained.

### 3.4 Pavement Density Testing

Density Acceptance - Item 401.3(i): Samples for determining pavement densities shall be taken with a coring machine or by cutting a 6-inch square out of the pavement. One set (three samples) shall be taken for every 1500 square yards of material placed. Density samples of the day's production should be taken and tested by noon of the following day and the results submitted to the Contracting Officer within 24 hours after completion of the testing. The bituminous course shall be compacted to greater than or equal to 92% and less than 97% of Theoretical Density.

-- End of Section --

## SECTION 02620

SUBDRAINAGE SYSTEM FOR CLOSURE STRUCTURE  
08/97

## 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 and represents the latest edition in force when this contract is awarded.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO M 252 Corrugated Polyethylene Drainage Tubing

AASHTO M 288-96 Geotextile Specification For Highway Applications

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3034 Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

ASTM D 3212 Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

ASTM F 949 Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Geotextile; G ED.  
Pipe and Fittings for Subdrains.

Samples of geotextile, pipe, and pipe fittings, before starting the work.

#### SD-07 Certificates

Geotextile; G ED.

Pipe and Fittings for Subdrains.

Certifications from the manufacturers attesting that materials meet specification requirements. Certificates are required for drain pipe, drain tile, fittings, and geotextile.

### 1.3 DELIVER, STORAGE, AND HANDLING

#### 1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with minimum handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. During shipment and storage, geotextiles shall be wrapped in a heavy duty protective covering. The storage area shall protect the geotextile from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight. Plastic pipe shall be installed within 6 months from the date of manufacture unless otherwise approved.

#### 1.3.2 Handling

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

## PART 2 PRODUCTS

### 2.1 PIPE AND FITTINGS FOR SUBDRAINS

Pipe and fittings for subdrains shall be of the types and sizes indicated.

#### 2.1.1 Plastic Pipe

Pipes for the toe drain and wall drains at the closure shall be of the types and meet the requirements as specified herein. The pipe sizes are shown on the drawings. All pipes for the subdrains, as shown on the drawings, shall be new (unused) plastic pipe which shall contain ultraviolet inhibitor to provide protection from exposure to direct sunlight. The piping and fittings shall be either polyvinyl Chloride (PVC) Pipe or corrugated polyethylene (PE). Both perforated and non-perforated (solid) piping will be required. Piping and fittings shall satisfy the requirements listed in the paragraphs below. The Contractor shall submit manufacturer's certificates, including supporting test results of compliance, indicating that the material meets the requirements specified herein.

##### 2.1.1.1 Polyvinyl Chloride (PVC) Pipe and Fittings

Polyvinyl chloride (PVC) pipe and fittings shall conform to ASTM D 3034.

#### 2.1.1.2 Corrugated Polyethylene (PE) Pipe and Fittings

Use AASHTO M 252 for pipes 3 to 10 inches in diameter. Fittings shall be manufacturer's standard type and shall conform to the indicated specification.

#### 2.1.1.3 Pipe Perforations

Water inlet area shall be a minimum of 1.0 square inch per linear foot. Manufacturer's standard perforated pipe which essentially meets these requirements may be substituted with prior approval of the Contracting Officer.

- a. Circular Perforations in Plastic Pipe: Circular holes shall be cleanly cut not more than  $3/8$  inch or less than  $3/16$  inch in diameter and arranged in rows parallel to the longitudinal axis of the pipe. Perforations shall be approximately 3 inches center-to-center along rows. The rows shall be approximately 1-1/2 inches apart and arranged in a staggered pattern so that all perforations lie at the midpoint between perforations in adjacent rows. The rows shall be spaced over not more than 155 degrees of circumference. The spigot or tongue end of the pipe shall not be perforated for a length equal to the depth of the socket, and perforations shall continue at uniform spacing over the entire length of the pipe.
- b. Slotted Perforations in Plastic Pipe: Circumferential slots shall be cleanly cut so as not to restrict the inflow of water and uniformly spaced along the length and circumference of the tubing. Width of slots shall not exceed  $1/8$  inch nor be less than  $1/32$  inch. The length of individual slots shall not exceed 1-1/4 inches on 3 inch diameter tubing, 10 percent of the tubing inside nominal circumference on 4 to 8 inch diameter tubing, and 2-1/2 inches on 10 inch diameter tubing. Rows of slots shall be symmetrically spaced so that they are fully contained in 2 quadrants of the pipe. Slots shall be centered in the valleys of the corrugations of profile wall pipe.

#### 2.2 Geotextile

The geotextile shall be a needle punched nonwoven fabric or woven fabric except that slit film yarns shall not be used. The geotextile shall have MARV (minimum average roll value) strength properties meeting the Class 2 Geotextile Survivability requirements in accordance with AASHTO M 288-96.

The geotextile shall have MARV hydraulic properties meeting the requirements of AASHTO M 288-96 geotextile criteria for subsurface drainage (filtration) having a minimum permittivity of 1.0 sec<sup>-1</sup> and having an apparent opening size (AOS) no finer than the US Standard Sieve No. 70 and no coarser than the US Standard Sieve No. 100 sieve).

## 2.3 DRAINAGE STRUCTURES

Drainage structures shall be constructed in accordance with the applicable portions of Section 02630A - STORM DRAINAGE SYSTEM.

## 2.4 SUBDRAIN FILTER AND BEDDING MATERIAL

Subdrain filter and bedding material for the closure and wall subdrains shall consist of coarse drainage fill. The coarse drainage fill for the subdrain shall satisfy the material and placement requirements for coarse drainage fill as specified in Section 02331, LEVEE EMBANKMENT CONSTRUCTION AND BACKFILLING FOR CLOSURE STRUCTURE. The material shall be clean and free from soil and foreign materials. Material found to be dirty or otherwise contaminated shall be removed and replaced with material meeting the specific requirements, at no additional cost to the Government.

## PART 3 EXECUTION

### 3.1 EXCAVATION AND BEDDING FOR SUBDRAIN SYSTEMS

Trenching and excavation, including the removal of unstable material, for the subdrain features (toe drains) within the limits of the levee and closure foundations shall be in accordance with Section 02329, STRIPPING AND EXCAVATION FOR EMBANKMENTS AND CLOSURE STRUCTURE. Materials, as shown on the drawings, shall be placed in the excavation or trench as indicated or as required as replacement materials used in those areas where unstable materials were removed. The trenching and excavation for the subdrain features outside the limits of the levee embankment, closure, and floodwall foundations shall be in accordance with the applicable provisions specified in Section 02316a EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

### 3.2 INSTALLATION OF GEOTEXTILE AND PIPE FOR SUBDRAINS

#### 3.2.1 Installation of Geotextile

##### 3.2.1.1 Trench Lining and Overlaps

Trenches to be lined with geotextile shall be graded to obtain smooth side and bottom surfaces so that the geotextile will not bridge cavities in the soil or be damaged by projecting stones. The geotextile shall be laid flat but not stretched on the soil, and it shall be secured with anchor pins. Overlaps shall be at least 12 inches, and anchor pins shall be used along the overlaps. Geotextile shall completely envelope the filter material as shown on the drawings.

#### 3.2.2 Installation of Pipe for Subdrains

##### 3.2.2.1 Pipelaying

Each pipe shall be carefully inspected before it is laid. Any defective or damaged pipe shall be rejected. No pipe shall be laid when the trench

conditions or weather is unsuitable for such work. Water shall be removed from trenches by sump pumping or other approved methods. The pipe shall be laid to the grades and alignment as indicated. The pipe shall be bedded to the established gradeline. Perforations shall be centered on the bottom of the pipe. Pipes of either the bell-and-spigot type or the tongue-and-groove type shall be laid with the bell or groove ends upstream. All pipes in place shall be approved before backfilling.

#### 3.2.2.2 Jointings

- a. Polyvinyl Chloride (PVC) Pipe: Joints shall be in accordance with the requirements of ASTM D 3034, ASTM D 3212, or ASTM F 949.
- b. Perforated Corrugated Polyethylene Pipe: Perforated corrugated polyethylene drainage pipe shall be installed in accordance with the manufacturer's specifications and as specified herein. A pipe with physical imperfections shall not be installed. No more than 5 percent stretch in a section will be permitted.

#### 3.3 INSTALLATION OF FILTER MATERIAL AND BACKFILLING FOR SUBDRAINS

After pipe for subdrains has been laid, inspected, and approved, filter material (coarse drainage fill) shall be placed around and over the pipe to the depth indicated. The filter material shall be placed in layers not to exceed 6 inches thick, and each layer shall be moistened as necessary but not flooded and shall be thoroughly compacted by mechanical tampers or rammers to obtain the required density. Compaction of filter material and the placement and compaction of overlying backfill material shall be in accordance with the applicable provisions specified in Section 02331.

#### 3.4 TESTS

##### 3.4.1 Pipe Test

Strength tests of pipe shall conform to field service test requirements of the ASTM or AASHTO specifications covering the product (paragraph PIPE FOR SUBDRAINS).

##### 3.4.2 COARSE DRAINAGE FILL TESTING

Testing for the coarse drainage fill shall be performed in accordance with the requirements as specified in Section 02331.

-- End of Section --

## SECTION 02630A

STORM-DRAINAGE SYSTEM  
03/00

## 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 HB-16	(1996) Standard Specifications for Highway Bridges
AASHTO M 198	(1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets
AASHTO M 294	(1998) Corrugated Polyethylene Pipe, 300- to 1200- mm Diameter
AASHTO MP 7	(1997) Corrugated Polyethylene Pipe, 1350 and 1500 mm Diameter

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 48	(1994a) Gray Iron Castings
ASTM A 123/A 123M	(1997ael) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 536	(1999el) Ductile Iron Castings
ASTM C 32	(1999el) Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C 55	(1999) Concrete Brick
ASTM C 62	(1997a) Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C 76	(1999) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 139	(1999) Concrete Masonry Units for Construction of Catch Basins and Manholes

ASTM C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 270	(1997) Mortar for Unit Masonry
ASTM C 425	(1998b) Compression Joints for Vitrified Clay Pipe and Fittings
ASTM C 443	(1998) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1997) Precast Reinforced Concrete Manhole Sections
ASTM C 789	(1998) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
ASTM C 850	(1998) Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 Ft. of Cover Subjected to Highway Loadings
ASTM C 877	(1994) External Sealing Bands for Noncircular Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C 923	(1998) Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Materials
ASTM D 1056	(1998) Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1171	(1994) Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 1751	(1999) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984; R 1996e1) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 3350	(1998a) Polyethylene Plastics Pipe and Fittings Materials
ASTM F 477	(1999) Elastomeric Seals (Gaskets) for Joining Plastic Pipe



applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

### 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. Before, during, and after installation, plastic pipe and fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer. Solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials required to install plastic pipe shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.

#### 1.3.2 Handling

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

## PART 2 PRODUCTS

### 2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

#### 2.1.1 Concrete Pipe

ASTM C 76, Class III.

#### 2.1.2 PE Pipe

The pipe manufacturer's resin certification indicating the cell classification of PE used to manufacture the pipe shall be submitted prior to installation of the pipe. The minimum cell classification for polyethylene plastic shall apply to each of the seven primary properties of the cell classification limits in accordance with ASTM D 3350.

##### 2.1.2.1 Smooth Wall PE Pipe

ASTM F 714, maximum DR of 21 for pipes 3 to 24 inches in diameter and maximum DR of 26 for pipes 26 to 48 inches in diameter. Pipe shall be produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 335434C.

2.1.2.2 Corrugated PE Pipe

AASHTO M 294, Type S or D, for pipes 12 to 48 inches and AASHTO MP 7, Type S or D, for pipes 54 to 60 inches produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class in accordance with AASHTO M 294. Pipe walls shall have the following properties:

Nominal Size (in.)	Minimum Wall Area (square in/ft)	Minimum Moment of Inertia of Wall Section (in to the 4th/in)
12	1.50	0.024
15	1.91	0.053
18	2.34	0.062
24	3.14	0.116
30	3.92	0.163
36	4.50	0.222
42	4.69	0.543
48	5.15	0.543
54	5.67	0.800
60	6.45	0.800

2.1.2.3 Profile Wall PE Pipe

ASTM F 894, RSC 160, produced from PE certified by the resin producer as meeting the requirements of ASTM D 3350, minimum cell class 334433C. Pipe walls shall have the following properties:

Nominal Size (in.)	Minimum Wall Area (square in/ft)	Cell Class 334433C	Cell Class 335434C
18	2.96	0.052	0.038
21	4.15	0.070	0.051
24	4.66	0.081	0.059
27	5.91	0.125	0.091
30	5.91	0.125	0.091
33	6.99	0.161	0.132
36	8.08	0.202	0.165
42	7.81	0.277	0.227
48	8.82	0.338	0.277

2.2 DRAINAGE STRUCTURES

### 2.2.1 Standard Manholes, Type M Inlets and End Sections

a. All materials for manholes and inlets shall comply with Section 605 of PADOT Publication 408, unless otherwise specified in these specifications.

b. All materials for end sections shall comply with Section 616 of PADOT Publication 408, unless otherwise specified in these specifications.

### 2.2.2 Precast Reinforced Concrete Box

For highway loadings with 2 feet of cover or more or subjected to dead load only, ASTM C 789; for less than 2 feet of cover subjected to highway loading, ASTM C 850.

## 2.3 MISCELLANEOUS MATERIALS

### 2.3.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 4,000 psi concrete under Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. The concrete mixture shall have air content by volume of concrete, based on measurements made immediately after discharge from the mixer, of 5 to 7 percent when maximum size of coarse aggregate exceeds 1-1/2 inches. Air content shall be determined in accordance with ASTM C 231. The concrete covering over steel reinforcing shall not be less than 1 inch thick for covers and not less than 1-1/2 inches thick for walls and flooring. Concrete covering deposited directly against the ground shall have a thickness of at least 3 inches between steel and ground. Expansion-joint filler material shall conform to ASTM D 1751, or ASTM D 1752, or shall be resin-impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

### 2.3.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar but in no case shall exceed 5 1/2 gallons of water per sack of cement. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

### 2.3.3 Precast Concrete Segmental Blocks

Precast concrete segmental block shall conform to ASTM C 139, not more than 8 inches thick, not less than 8 inches long, and of such shape that joints can be sealed effectively and bonded with cement mortar.

#### 2.3.4 Brick

Brick shall conform to ASTM C 62, Grade SW; ASTM C 55, Grade S-I or S-II; or ASTM C 32, Grade MS. Mortar for jointing and plastering shall consist of one part portland cement and two parts fine sand. Lime may be added to the mortar in a quantity not more than 25 percent of the volume of cement. The joints shall be filled completely and shall be smooth and free from surplus mortar on the inside of the structure. Brick structures shall be plastered with 1/2 inch of mortar over the entire outside surface of the walls. For square or rectangular structures, brick shall be laid in stretcher courses with a header course every sixth course. For round structures, brick shall be laid radially with every sixth course a stretcher course.

#### 2.3.5 Precast Reinforced Concrete Manholes

Precast reinforced concrete manholes shall conform to ASTM C 478. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall be smoothed to a uniform surface on both interior and exterior of the structure.

#### 2.3.6 Frame and Cover for Gratings

Frame and cover for gratings shall be cast gray iron, ASTM A 48, Class 35B; cast ductile iron, ASTM A 536, Grade 65-45-12. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans.

#### 2.3.7 Joints

##### 2.3.7.1 Flexible Joints

- a. Materials: Flexible joints shall be made with plastic or rubber-type gaskets for concrete pipe. The design of joints and the physical requirements for plastic gaskets shall conform to AASHTO M 198, and rubber-type gaskets shall conform to ASTM C 443. Factory-fabricated resilient joint materials shall conform to ASTM C 425. Gaskets shall have not more than one factory-fabricated splice.
- b. Test Requirements: Rubber gaskets shall comply with the oil resistant gasket requirements of ASTM C 443. Certified copies of test results shall be delivered to the Contracting Officer before gaskets or jointing materials are installed. Alternate types of watertight joint may be furnished, if specifically approved.

##### 2.3.7.2 External Sealing Bands

Requirements for external sealing bands shall conform to ASTM C 877.

##### 2.3.7.3 Flexible Gasketed Joints

- a. Gaskets: When infiltration or exfiltration is a concern for pipe lines, the couplings may be required to have gaskets. The

closed-cell expanded rubber gaskets shall be a continuous band approximately 7 inches wide and approximately 3/8 inch thick, meeting the requirements of ASTM D 1056, Type 2 A1, and shall have a quality retention rating of not less than 70 percent when tested for weather resistance by ozone chamber exposure, Method B of ASTM D 1171. Rubber O-ring gaskets shall be 13/16 inch in diameter for pipe diameters of 36 inches or smaller. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of AASHTO M 198 or ASTM C 443. Flexible plastic gaskets shall conform to requirements of AASHTO M 198, Type B.

- b. Connecting Bands: Connecting bands shall be of the type, size and sheet thickness of band, and the size of angles, bolts, rods and lugs as indicated or where not indicated as specified in the applicable standards or specifications for the pipe. Exterior rivet heads in the longitudinal seam under the connecting band shall be countersunk or the rivets shall be omitted and the seam welded. Watertight joints shall be tested and shall meet the test requirements of paragraph HYDROSTATIC TEST ON WATERTIGHT JOINTS.

#### 2.3.7.4 Smooth Wall PE Plastic Pipe

Pipe shall be joined using butt fusion method as recommended by the pipe manufacturer.

#### 2.3.7.5 Corrugated PE Plastic Pipe

Water tight joints shall be made using a PVC or PE coupling and rubber gaskets as recommended by the pipe manufacturer. Rubber gaskets shall conform to ASTM F 477. Soil tight joints shall conform to the requirements in AASHTO HB-16, Division II, Section 26.4.2.4. (e) for soil tightness and shall be as recommended by the pipe manufacturer.

#### 2.3.7.6 Profile Wall PE Plastic Pipe

Joints shall be gasketed or thermal weld type with integral bell in accordance with ASTM F 894.

### 2.4 STEEL LADDER

Steel ladder shall be provided where the depth of the manhole exceeds 12 feet. These ladders shall be not less than 16 inches in width, with 3/4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2-1/2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123/A 123M.

### 2.5 RESILIENT CONNECTORS

Flexible connectors used for connecting pipe to manholes and inlets shall conform to ASTM C 923.

## PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02316a "Excavation, Trenching, and Backfilling for Utilities Systems".

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. Initial backfill material as specified in Section 02316a shall be used as bedding material and shall be placed as shown on the drawings.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Plastic pipe shall be protected from exposure to direct sunlight prior to laying, if necessary to maintain adequate pipe stiffness and meet installation deflection requirements. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not 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. Deflection of installed flexible pipe shall not exceed the following limits:

TYPE OF PIPE	MAXIMUM ALLOWABLE DEFLECTION (%)
Plastic	7.5

Not less than 30 days after the completion of backfilling, the Government may perform a deflection test on the entire length of installed flexible pipe using a mandrel or other suitable device. Installed flexible pipe showing deflections greater than those indicated above shall be retested by a run from the opposite direction. If the retest also fails, the suspect pipe shall be replaced at no cost to the Government.

3.3.1 Concrete, PVC, and Ribbed PVC

Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.

3.3.2 Corrugated PE Pipe

Laying shall be with the separate sections joined firmly on a bed shaped to line and grade and shall follow manufacturer's recommendations.

3.4 JOINTING

### 3.4.1 Concrete Pipe

#### 3.4.1.1 Flexible Joints

Gaskets and jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pushed home. If, while the joint is being made the gasket becomes visibly dislocated the pipe shall be removed and the joint remade.

### 3.5 DRAINAGE STRUCTURES

#### 3.5.1 Manholes, Endwalls and Inlets

Construction shall be as specified in Section 605 of PADOT Publication 408 and in accordance with PADOT Standard Drawings. Shop drawings bearing a seal of an Engineer registered in the State of Pennsylvania shall be submitted for manholes and inlets exceeding the dimensions in the PADOT Standard Drawings.

### 3.6 STEEL LADDER INSTALLATION

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

### 3.7 BACKFILLING

#### 3.7.1 Backfilling Pipe in Trenches

Placement, backfilling, compaction, and density testing requirements for the installation of the pipes, inlets, and manholes shall be in accordance with the applicable portions of Section 02316a.

-- End of Section --

## SECTION 02770

## CONCRETE SIDEWALKS

## 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 and represent the latest edition in force when this contract is awarded.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO M 182 Burlap Cloth Made from Jute or Kenaf

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185 Steel Welded Wire Fabric, Plain, for  
Concrete Reinforcement

ASTM A 615/A 615M Deformed and Plain Billet-Steel Bars for  
Concrete Reinforcement

ASTM A 616/A 616M Rail-Steel Deformed and Plain Bars for  
Concrete Reinforcement

ASTM A 617/A 617M Axle-Steel Deformed and Plain Bars for  
Concrete Reinforcement

ASTM C 31/C 31M Making and Curing Concrete Test Specimens  
in the Field

ASTM C 143 Slump of Hydraulic Cement Concrete

ASTM C 171 Sheet Materials for Curing Concrete

ASTM C 172 Sampling Freshly Mixed Concrete

ASTM C 173 Air Content of Freshly Mixed Concrete by  
the Volumetric Method

ASTM C 231 Air Content of Freshly Mixed Concrete by  
the Pressure Method

ASTM C 309 Liquid Membrane-Forming Compounds for  
Curing Concrete

ASTM D 1751 Preformed Expansion Joint Filler for

Concrete Paving and Structural  
Construction (Nonextruding and Resilient  
Bituminous Types)

ASTM D 1752                      Preformed Sponge Rubber and Cork Expansion  
Joint Fillers for Concrete Paving and  
Structural Construction

ASTM D 3405                      Joint Sealants, Hot-Applied, for Concrete  
and Asphalt Pavements

CORPS OF ENGINEERS (COE)

COE CRD-C 527                      Standard Specification for Joint Sealants,  
Cold-Applied, Non-Jet-Fuel-Resistant, for  
Rigid and Flexible Pavements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-05 Design Data

Concrete; G ED.

Concrete mix design 30 days prior to use on the project.

SD-06 Test Reports

Field Quality Control.

Copies of all test reports within 24 hours of completion of the test.

1.3 WEATHER LIMITATIONS

1.3.1 Placing During Cold Weather

Concrete placement shall be discontinued when the air temperature reaches 40 degrees F and is falling. Placement may begin when the air temperature reaches 35 degrees F and is rising. Provisions shall be made to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement shall be approved in writing. Approval will be contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering

and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

#### 1.3.2 Placing During Warm Weather

The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F.

### 1.4 PLANT, EQUIPMENT, MACHINES, AND TOOLS

#### 1.4.1 General Requirements

Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The Contracting Officer shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

#### 1.4.2 Slip Form Equipment

Slip form paver will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

## PART 2 PRODUCTS

### 2.1 CONCRETE

Concrete shall conform to the applicable requirements of Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE except as otherwise specified. Concrete shall have a minimum compressive strength of 3500 psi at 28 days except as otherwise specified. Maximum size of aggregate shall be 1-1/2 inches.

#### 2.1.1 Air Content

Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

#### 2.1.2 Slump

The concrete slump shall be 2 inches plus or minus 1 inch for hand placed concrete and 1 inch plus or minus 1/2 inch for slipformed concrete where determined in accordance with ASTM C 143.

#### 2.1.3 Reinforcement Steel

Reinforcement bars shall conform to ASTM A 615/A 615M, ASTM A 616/A 616M, or ASTM A 617/A 617M. Wire mesh reinforcement shall conform to ASTM A 185.

## 2.2 CONCRETE CURING MATERIALS

### 2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

### 2.2.2 Burlap

Burlap shall conform to AASHTO M 182.

### 2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2.

## 2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

## 2.4 JOINT FILLER STRIPS

### 2.4.1 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D 1751 or ASTM D 1752, 3/8 inch thick, unless otherwise indicated.

## 2.5 JOINT SEALANTS

### 2.5.1 Joint Sealant, Cold-Applied

Joint sealant, cold-applied shall conform to COE CRD-C 527.

### 2.5.2 Joint Sealant, Hot-Poured

Joint sealant, hot-poured shall conform to ASTM D 3405.

## 2.6 FORM WORK

Form work shall be designed and constructed to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2-inch nominal thickness, straight and free from warp, twist, loose knots,

splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4-inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 2 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

#### 2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

#### 2.6.2 Porous Fill

Porous Fill shall consist of crushed stone, slag, gravel (crushed or uncrushed), sand or other approved materials. Maximum particle size shall be 1 inch with not more than 20 percent passing the #4 sieve.

### PART 3 EXECUTION

#### 3.1 SUBGRADE PREPARATION

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted in conformance with Section 02331 Levee Embankment Construction and Backfilling for Closure Structure.

##### 3.1.1 Sidewalk Porous Fill

The porous fill shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

##### 3.1.2 Maintenance of Subgrade and Porous Fill

The subgrade and porous fill shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade, and porous fill, as applicable shall be in a moist condition when concrete is placed. The subgrade and porous fill shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

#### 3.2 FORM SETTING

Forms shall be set to the indicated alignment, grade and dimensions. Forms shall be held rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete

found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

### 3.2.1 Sidewalks

Forms for sidewalks shall be set with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment shall be checked with a 10 foot straightedge. Forms shall have a transverse slope of 1/4 inch per foot with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

## 3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

### 3.3.1 Formed Sidewalks

Concrete shall be placed in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with an approved vibrator, and the surface shall be finished to grade with a wood float, bull float, or darby, edged and broom finished.

### 3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic.

### 3.3.3 Edge and Joint Finishing

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

### 3.3.4 Surface and Thickness Tolerances

Finished surfaces shall not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

## 3.4 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular

areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width.

Transverse expansion joints shall be installed at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated.

#### 3.4.1 Sidewalk Contraction Joints

The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

#### 3.4.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 3/8 inch joint filler strips. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and filled with joint sealer. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material.

Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

#### 3.4.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

### 3.5 CURING AND PROTECTION

#### 3.5.1 General Requirements

Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall

be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

#### 3.5.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

#### 3.5.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

#### 3.5.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet per gallon for both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for

curing concrete pavement shall be provided at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane. Any membrane curing agent must be removed at the end of the curing period if a protective coating is to be applied.

#### 3.5.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

#### 3.5.3 Protection

Completed concrete shall be protected from damage until accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

#### 3.5.4 Protective Coating

If it is anticipated that concrete will be exposed to temperatures below 40 degrees F within 9 weeks after placement, a protective coating of linseed oil mixture shall be applied to the exposed-to-view concrete surface.

##### 3.5.4.1 Application

Curing and backfilling operation shall be completed prior to applying protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be not more than 50 square yards per gallon for first application and not more than 70 square yards per gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

##### 3.5.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied at temperatures lower than 50 degrees F.

### 3.6 FIELD QUALITY CONTROL

#### 3.6.1 General Requirements

The Contractor shall perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing.

Based upon the results of these inspections and tests, the Contractor shall take the action and submit reports as required below, and any additional tests to insure that the requirements of these specifications are met.

### 3.6.2 Concrete Testing

#### 3.6.2.1 Strength Testing

The Contractor shall provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 50 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance shall be molded in conformance with ASTM C 31/C 31M by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

#### 3.6.2.2 Air Content

Air content shall be determined in accordance with ASTM C 173 or ASTM C 231.

ASTM C 231 shall be used with concretes and mortars made with relatively dense natural aggregates. Air content tests shall be made on each truckload of concrete or batch of concrete mixed on site. If results are out of tolerance, the placing foreman shall be notified and he shall take appropriate action to have the air content corrected at the plant.

#### 3.6.2.3 Slump Test

One slump test shall be made on each truckload of concrete of batch of concrete mixed on site.

#### 3.6.3 Thickness Evaluation

The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine.

If a slip form paver is used for sidewalk placement, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

#### 3.6.4 Surface Evaluation

The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

### 3.7 SURFACE DEFICIENCIES AND CORRECTIONS

### 3.7.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

### 3.7.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch.

Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

### 3.7.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

-- End of Section --

## SECTION 02921

SEEDING  
05/01

## 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.

## U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act (1995) Federal Seed Act Regulations Part 201

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 602 (1995a) Agricultural Liming Materials

ASTM D 4972 (1995a) pH of Soils

ASTM D 5268 (1992; R 1996) Topsoil Used for Landscaping Purposes

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-03 Product Data

Equipment  
Surface Erosion Control Material  
Chemical Treatment Material

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, surface erosion control material and chemical treatment material.

A listing of equipment to be used for the seeding operation.

## Delivery

Delivery schedule.

#### Finished Grade and Topsoil

Finished grade status.

#### Topsoil

Availability of topsoil from the stripping and stock piling operation.

#### Quantity Check

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

#### Seed Establishment Period

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

#### Maintenance Record

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.

#### SD-04 Samples

Delivered Topsoil; G AR

Samples taken from several locations at the source.

#### SD-06 Test Reports

##### Equipment Calibration

Certification of calibration tests conducted on the equipment used in the seeding operation.

##### Soil Test

Certified reports of inspections and laboratory tests, prepared by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

#### SD-07 Certificates

Seed; G, AR

Topsoil; G, AR

pH Adjuster; G, AR

Fertilizer; G, AR

Organic Material; G, AR

Soil Conditioner; G, AR  
Mulch; G, AR

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

- a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, and date tested.
- b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical and mechanical analyses.
- c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.
- d. Fertilizer. Chemical analysis and composition percent.
- e. Organic Material: Composition and source.
- f. Soil Conditioner: Composition and source.
- g. Mulch: Composition and source.

### 1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

### 1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

#### 1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

##### 1.4.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

##### 1.4.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

#### 1.4.2 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five

months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

Materials shall be stored in designated areas. Seed, lime, and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.4.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.1.2 Permanent Seed Species and Mixtures

Permanent seed species and mixtures shall be proportioned by weight as follows:

Botanical Name	Common Name	Mixture Percent by Weight	Percent Pure Live Seed
SEED			
Festuca longifolia	Hard Fescue Reliant or improy variety from latest Agronomy Mimeo	4.5 lbs. per 1000 sq. ft.	83% min.

Botanical Name	Common Name	Mixture Percent by Weight	Percent Pure Live Seed
Loium perenne	Perennial Rye	5 l.bs per 1000 sq. ft.	83% min.

2.1.3 Temporary Seed Species

Temporary seed species for surface erosion control or overseeding shall be as follows:

Common Name	Rate	Percent Pure Live Seed
Winter Rye	140 lbs. per acre	83% min.

2.1.4 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.5 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.

2.1.6 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer.

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with Section 02329 STRIPPING AND EXCAVATION. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test for the seed specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots or trash larger than 3/4 inch diameter. Topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, fertilizer, organic material and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.3.1 pH Adjuster

The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground

limestone, sulfur, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

#### 2.3.1.1 Limestone

Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.

#### 2.3.1.2 Hydrated Lime

Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.

#### 2.3.1.3 Burnt Lime

Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 35 percent shall pass through a No. 60 sieve.

#### 2.3.2 Fertilizer

Mixture ratio shall be as recommended by the soil test. Fertilizer shall be controlled release commercial grade, free flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients.

#### 2.3.3 Nitrogen Carrier Fertilizer

Mixture ratio shall be as recommended by the soil test. Nitrogen carrier fertilizer shall be commercial grade, free flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.

#### 2.3.4 Organic Material

Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.

##### 2.3.4.1 Bonemeal

Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.

##### 2.3.4.2 Rotted Manure

Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials. It shall contain no chemicals or ingredients harmful to plants.

The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

## 2.3.4.3 Decomposed Wood Derivatives

Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.

Nitrogen Content: Minimum percent based on dry weight.

<u>Material</u>	<u>Percent</u>
Sawdust	1.0

Particle Size: Minimum percent by weight passing.

<u>Sieve Size</u>	<u>Percent</u>
No. 4	95
No. 8	80

## 2.3.4.4 Recycled Compost

Compost shall be a well decomposed, stable, weed free organic matter source. Compost shall be derived from biosolids (treated sewage sludge); yard trimmings. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length.

## 2.3.4.5 Worm Castings

Worm castings shall be screened from worms and food source, and shall be commercially packaged.

## 2.3.5 Soil Conditioner

Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test.

## 2.3.5.1 Sand

Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the inclusion of trace minerals and nutrients.

## 2.3.5.2 Gypsum

Gypsum shall be commercially packaged, free flowing, and a minimum 95

percent calcium sulfate by volume.

## 2.4 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.

### 2.4.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

### 2.4.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

### 2.4.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

### 2.4.4 Paper Fiber

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

## 2.5 WATER

Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

## 2.6 SURFACE EROSION CONTROL MATERIAL

Surface erosion control material shall conform to the following:

### 2.6.1 Surface Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

### 2.6.2 Surface Erosion Control Fabric

Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.

### 2.6.3 Surface Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

### 2.6.4 Surface Erosion Control Chemicals

Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

### 2.6.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids shall resist mold growth.

### 2.6.6 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

## PART 3 EXECUTION

### 3.1 INSTALLING SEED TIME AND CONDITIONS

#### 3.1.1 Seeding Time

Seed shall be installed from MAR 01 to MAY 30 for spring establishment; and from SEP 01 to NOV 01 for fall establishment.

#### 3.1.2 Seeding Conditions

Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed.

When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.

#### 3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

#### 3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil shall be tested in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, and mechanical analysis. Sample

collection on site shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species specified.

### 3.2 SITE PREPARATION

#### 3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02331 LEVEE EMBANKMENT CONSTRUCTION, prior to the commencement of the seeding operation.

#### 3.2.2 Application of Soil Amendments

##### 3.2.2.1 Applying pH Adjuster

The pH adjuster shall be applied as recommended by the soil test. The pH adjuster shall be incorporated into the soil to 4-6 inch depth or may be incorporated as part of the tillage operation.

##### 3.2.2.2 Applying Fertilizer

The fertilizer shall be applied as recommended by the soil test. Fertilizer shall be incorporated into the soil to 4-6 inch depth or may be incorporated as part of the tillage operation.

##### 3.2.2.3 Applying Soil Conditioner

The soil conditioner shall be as recommended by the soil test. The soil conditioner shall be spread uniformly over the soil a minimum 1 inch depth and thoroughly incorporated by tillage into the soil to 4-6 inch depth.

#### 3.2.3 Tillage

Soil on slopes up to a maximum 2.5-horizontal-to-1-vertical shall be tilled to a minimum 4 inch depth. Rototillers shall be used where soil conditions and length of slope permit. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster, fertilizer, and soil conditioner may be applied during this procedure.

#### 3.2.4 Prepared Surface

##### 3.2.4.1 Preparation

The prepared surface shall be a maximum 1 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove

debris.

#### 3.2.4.2 Turf Area Debris

Debris and stones over a minimum 5/8 inch in any dimension shall be removed from the surface.

#### 3.2.4.3 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

### 3.3 INSTALLATION

Prior to installing seed, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

#### 3.3.1 Installing Seed

Seeding method shall be Broadcast Seeding or Hydroseeding. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer.

##### 3.3.1.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate shown in Paragraph: Permanent Seed Species and Mixtures using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1/4 inch depth by disk harrow, steel mat drag, cultipacker, or other approved device.

##### 3.3.1.2 Rolling

The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled.

#### 3.3.2 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate shown in Paragraph: Permanent Seed Species and Mixtures. Seed and starter fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded

area shall not be rolled.

### 3.3.3 Mulching

#### 3.3.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre.

Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

#### 3.3.3.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

#### 3.3.3.3 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.

#### 3.3.3.4 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

### 3.3.4 Watering Seed

Watering shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.

## 3.4 SURFACE EROSION CONTROL

### 3.4.1 Surface Erosion Control Material

Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.

### 3.4.2 Temporary Seeding

All soil amendments, other than starter fertilizer, shall be incorporated in the topsoil as indicated in Paragraph: TILLAGE. The application rate shall be as shown in Paragraph: Temporary Seed Species. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.

#### 3.4.2.1 Soil Amendments

When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Seed.

#### 3.4.2.2 Remaining Soil Amendments

The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing seed.

### 3.5 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

### 3.6 RESTORATION AND CLEAN UP

#### 3.6.1 Restoration

Existing turf areas, pavements, and facilities that have been damaged from the seeding operation shall be restored to original condition at Contractor's expense.

#### 3.6.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned.

### 3.7 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed.

### 3.8 SEED ESTABLISHMENT PERIOD

#### 3.8.1 Commencement

The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of work under this contract and shall end 3

months after the last day of the seeding operation or the last day of the contract, whichever is latest. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

### 3.8.2 Satisfactory Stand of Grass Plants

Grass plants shall be evaluated for species and health after the grass plants have been mowed 3 times and bare spots are less than 2 percent of turf and weeds less than 10 percent of turf.

#### 3.8.2.1 Lawn Area

A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 100 grass plants per square foot. Bare spots shall be a maximum 3 inches square. The total bare spots shall be a maximum 2 percent of the total seeded area.

### 3.8.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.

#### 3.8.3.1 Mowing

- a. Turf Areas: Turf areas shall be mowed to a minimum 3 inch height when the turf is a maximum 5 inches high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.

#### 3.8.3.2 Post-Fertilization

The fertilizer shall be applied as recommended by the soil test. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.

#### 3.8.3.3 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph SITE PREPARATION.

#### 3.8.3.4 Maintenance Record

A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

### 3.9 FINAL ACCEPTANCE

#### 3.9.1 Preliminary Inspection

Prior to completion of the Turf Establishment Period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be established in writing. The acceptability of the turf in accordance with the Turf Establishment Period shall be determined. An unacceptable stand of turf shall be repaired as soon as turfing conditions permit.

#### 3.9.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing.

-- End of Section --

## SECTION 03100A

STRUCTURAL CONCRETE FORMWORK  
05/98

## 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.

## ACI INTERNATIONAL (ACI)

ACI 347R (1994) Guide to Formwork for Concrete

## AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (1995) Basic Hardboard

## U.S. DEPARTMENT OF COMMERCE (DOC)

PS-1 (1996) Voluntary Product Standard -  
Construction and Industrial Plywood

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

## Formwork

Drawings showing details of formwork, including dimensions of fiber voids, joints, supports, studding and shoring, and sequence of form and shoring removal.

## SD-03 Product Data

## Design

Design analysis and calculations for form design and methodology used in the design.

### Form Materials

Manufacturer's data including literature describing form materials, accessories, and form releasing agents.

### Form Releasing Agents

Manufacturer's recommendation on method and rate of application of form releasing agents.

## 1.3 DESIGN

Formwork shall be designed in accordance with methodology of ACI 347R for anticipated loads, lateral pressures, and stresses. Forms shall be capable of producing a surface which meets the requirements of the class of finish specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE. Forms shall be capable of withstanding the pressures resulting from placement and vibration of concrete.

## PART 2 PRODUCTS

### 2.1 FORM MATERIALS

#### 2.1.1 Forms For Class A Finish

Forms for Class A finished surfaces shall be plywood panels conforming to PS-1, Grade B-B concrete form panels, Class I or II. Other form materials or liners may be used provided the smoothness and appearance of concrete produced will be equivalent to that produced by the plywood concrete form panels. Forms for round columns shall be the prefabricated seamless type.

#### 2.1.2 Forms For Class C Finish

Forms for Class C finished surfaces shall be shiplap lumber; plywood conforming to PS-1, Grade B-B concrete form panels, Class I or II; tempered concrete form hardboard conforming to AHA A135.4; other approved concrete form material; or steel, except that steel lining on wood sheathing shall not be used. Forms for round columns may have one vertical seam.

#### 2.1.3 Form Ties

Form ties shall be factory-fabricated metal ties, shall be of the removable or internal disconnecting or snap-off type, and shall be of a design that will not permit form deflection and will not spall concrete upon removal. Solid backing shall be provided for each tie. Except where removable tie rods are used, ties shall not leave holes in the concrete surface less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter. Removable tie rods shall be not more than 1-1/2 inches in diameter.

#### 2.1.4 Form Releasing Agents

Form releasing agents shall be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion

nor impede the wetting of surfaces to be cured with water or curing compounds.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 Formwork

Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE and conforming to construction tolerance given in TABLE 1. Where concrete surfaces are to have a Class A finish, joints in form panels shall be arranged as approved.

Where forms for continuous surfaces are placed in successive units, the forms shall fit over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. Surfaces of forms to be reused shall be cleaned of mortar from previous concreting and of all other foreign material before reuse. Form ties that are to be completely withdrawn shall be coated with a nonstaining bond breaker.

#### 3.2 CHAMFERING

Except as otherwise shown, external corners that will be exposed shall be chamfered, 1-inch by 1-inch by moldings placed in the forms.

#### 3.3 COATING

Forms for Class A finished surfaces shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for Class C finished surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather with probable freezing temperatures, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

#### 3.4 REMOVAL OF FORMS

Forms shall be removed preventing injury to the concrete and ensuring the complete safety of the structure. Formwork for columns, walls, side of beams and other parts not supporting the weight of concrete may be removed when the concrete has attained sufficient strength to resist damage from the removal operation but not before at least 24 hours has elapsed since concrete placement. Supporting forms and shores shall not be removed from beams, floors and walls until the structural units are strong enough to carry their own weight and any other construction or natural loads. Supporting forms or shores shall not be removed before the concrete strength has reached 70 percent of design strength, as determined by field cured cylinders or other approved methods. This strength shall be demonstrated by job-cured test specimens, and by a structural analysis considering the proposed loads in relation to these test strengths and the

strength of forming and shoring system. The job-cured test specimens for form removal purposes shall be provided in numbers as directed and shall be in addition to those required for concrete quality control. The specimens shall be removed from molds at the age of 24 hours and shall receive, insofar as possible, the same curing and protection as the structures they represent.

TABLE 1

TOLERANCES FOR FORMED SURFACES

1. Variations from the plumb:	In any 10 feet of length ----- 1/4 inch
a. In the lines and surfaces of foundations, walls and in arises	Maximum for entire length ----- 1 inch
b. For reveals, joint grooves, and other conspicuous lines	Maximum for entire length----- 1/2 inch
2. Variation from the level or from the elevations indicated on the drawings:	In any 10 feet of length -----1/4 inch In any bay or in any 20 feet of length----- 3/8 inch
a. In horizontal reveals, horizontal grooves, and other conspicuous lines	Maximum for entire length----- 1/2 inch
3. Variation in the locations of post recess, sleeves, floor openings, and wall opening	Minus ----- 1/4 inch Plus ----- 1/4 inch
4. Variation in cross sectional thickness of slabs and walls	Minus ----- 1/4 inch Plus ----- 1/2 inch
5. Footings:	
a. Variation of dimensions in plan	Minus ----- 1/2 inch Plus ----- 2 inches when formed or plus 3 inches when placed against unformed excavation
b. Misplacement of eccentricity	2 percent of the footing width in the direction of

TABLE 1

TOLERANCES FOR FORMED SURFACES

	misplacement but not more than 2 inches
c. Reduction in thickness of specified thickness	Minus ----- 1 percent

-- End of Section --

## SECTION 03151A

EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS IN CONCRETE FOR CIVIL WORKS  
09/01

## 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 C 920	(1998) Elastomeric Joint Sealants
ASTM D 1751	(1999) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984; R 1996e1) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

## U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 513	(1974) Corps of Engineers Specifications for Rubber Waterstops
COE CRD-C 572	(1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-03 Product Data

Splicing Waterstops; G, AR

Procedures for splicing waterstops shall be submitted.

## SD-04 Samples

Field Molded Sealants and Primer

One gallon of field-molded sealant and one quart of primer (when primer is recommended by the sealant manufacturer) shall be provided for testing.

#### Waterstops

Waterstop materials and splice samples shall be submitted for inspection and testing and shall be identified to indicate manufacturer, type of material, size and quantity of material and shipment represented. Each materials sample shall be a piece not less than 12 inches long cut from each 200 feet of finished waterstop furnished, but not less than a total of 4 linear feet of each type and size furnished. For spliced segments of waterstops to be installed in the work, one spliced sample of each size and type for every 50 splices made in the factory and every 10 splices made at the job site shall be furnished for inspection and testing. The spliced samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each spliced sample shall be not less than 12 inches long.

#### SD-06 Test Reports

##### Premolded Expansion Joint Filler Strips

Certified manufacturer's test reports shall be provided for premolded expansion joint filler strips, compression seals and lubricant, and metallic waterstops to verify compliance with applicable specification.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Premolded Expansion Joint Filler Strips

Premolded expansion joint filler strips shall conform to ASTM D 1751 or ASTM D 1752, Type I, or resin impregnated fiberboard conforming to the physical requirements of ASTM D 994 and ASTM D 1751.

#### 2.1.2 Joint Seals and Sealants

##### 2.1.2.1 Field Molded Sealants and Primer

Field molded sealants and primer shall conform to ASTM C 920, Type M, Grade NS, Class 25, use NT for vertical joints and Type M, Grade P, Class 25, use T for horizontal joints. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material shall be compressible, nonshrink, nonreactive with sealant, and nonabsorptive material type such as extruded butyl or polychloroprene foam rubber.

### 2.1.3 Waterstops

#### 2.1.3.1 Non-Metallic Waterstops

Rubber waterstops shall conform to COE CRD-C 513. Polyvinylchloride waterstops shall conform to COE CRD-C 572.

### 2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

#### 2.2.1 Materials Tests

##### 2.2.1.1 Field-Molded Sealants

Samples of sealant and primer, when use of primer is recommended by the manufacturer, as required in paragraph FIELD MOLDED SEALANTS AND PRIMER, shall be tested by and at the expense of the Government for compliance with paragraph FIELD MOLDED SEALANTS AND PRIMER. If the sample fails to meet specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor.

##### 2.2.1.2 Non-Metallic Waterstops

Samples of materials and splices as required in paragraph WATERSTOPS shall be visually inspected and tested by and at the expense of the Government for compliance with COE CRD-C 513 or COE CRD-C 572 as applicable. If a sample fails to meet the specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor.

#### 2.2.2 Splicing Waterstops

##### 2.2.2.1 Procedure and Performance Qualifications

Procedure and performance qualifications for splicing waterstops shall be demonstrated in the presence of the Contracting Officer.

##### 2.2.2.2 Non-Metallic Waterstops

Procedure and performance qualifications for splicing non-metallic waterstops shall be demonstrated by the manufacturer at the factory and the Contractor at the job site by each making three spliced samples of each size and type of finished waterstop.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, as shown, and as directed.

##### 3.1.1 Expansion Joints

Premolded filler strips shall have oiled wood strips secured to the top

thereof and shall be accurately positioned and secured against displacement to clean, smooth concrete surfaces. The wood strips shall be slightly tapered, dressed and of the size required to install filler strips at the desired level below the finished concrete surface and to form the groove for the joint sealant or seals to the size shown. Material used to secure premolded fillers and wood strips to concrete shall not harm the concrete and shall be compatible with the joint sealant or seals. The wood strips shall not be removed until after the concrete curing period. The groove shall be thoroughly cleaned of all laitance, curing compound, foreign materials, protrusions of hardened concrete and any dust which shall be blown out of the groove with oil-free compressed air.

#### 3.1.1.1 Joints With Field-Molded Sealant

Joints shall not be sealed when the sealant, air or concrete temperature is less than 40 degrees F. Immediately prior to installation of field molded sealants, the joint shall be cleaned of all debris and further cleaned using water, chemical solvents or other means as recommended by the sealant manufacturer. The joints shall be dry prior to filling with sealant. Bond breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

#### 3.1.2 Contraction Joints

Joints requiring a bond breaker shall be coated with curing compound or with bituminous paint. Waterstops shall be protected during application of bond breaking material to prevent them from being coated.

#### 3.1.3 Waterstops

Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. All waterstops shall be installed so as to form a continuous watertight diaphragm in each joint. Adequate provision shall be made to support and protect the waterstops during the progress of work. Any waterstop punctured or damaged shall be replaced or repaired at the Contractor's expense. The concrete shall be thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued.

##### 3.1.3.1 Splices

Joints in waterstops shall be spliced together by qualified splicers using the approved splicing procedures to form a continuous watertight diaphragm. Splices shall be as followed:

- a. Non-Metallic Waterstops - All splices shall be made on a bench in a temporary shop provided at the site of the installation or at the manufacturer's plant. A miter guide and portable power saw shall be used to cut the ends to be joined to insure good alignment and contact between joined surfaces. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis,

protrusions and the like) shall be maintained across the splice.

b. Rubber Waterstops - Splices shall be vulcanized in accordance with the approved procedure.

c. Polyvinylchloride Waterstops - Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electrical heat source shall be used to make all splices. The correct temperature at which splices should be made will differ with the material concerned but the applied heat should be sufficient to melt but not char the plastic. Waterstops shall be reformed at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled and bent by hand in as sharp an angle as possible, shall show no sign of separation.

-- End of Section --

## SECTION 03201

STEEL BARS AND WELDED WIRE FABRIC FOR CONCRETE REINFORCEMENT FOR CIVIL WORKS  
10/01

## 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.

## ACI INTERNATIONAL (ACI)

- ACI 315 (1999) Details and Detailing of Concrete Reinforcement
- ACI 318/318R (1999) Building Code Requirements for Structural Concrete and Commentary

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM A 184/A 184M (1996) Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
- ASTM A 185 (1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
- ASTM A 370 (1997a) Mechanical Testing of Steel Products
- ASTM A 615/A 615M (2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- ASTM A 775/A 775M (1992000) Epoxy-Coated Reinforcing Steel Bars
- ASTM E 94 (2000) Radiographic Testing

## AMERICAN WELDING SOCIETY (AWS)

- AWS D1.4 (1998) Structural Welding Code - Reinforcing Steel

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

Fabrication and Placement; G|ED

The Contractor shall submit shop drawings which include: reinforcement steel placement drawings; reinforcement steel schedules showing quantity, size, shape, dimensions, weight per foot, total weights and bending details; and details of bar supports showing types, sizes, spacing and sequence.

## SD-03 Product Data

Butt-Splices; G|ED

The Contractor shall submit the proposed procedure for butt-splicing steel bars prior to making the test butt-splices for qualification of the procedure. Properties and analyses of steel bars and splicing materials shall be included in the submitted procedure. Physical properties of splicing sleeves shall include length, inside and outside diameters, and inside surface details.

Materials; G|AR

A system of identification which shows the disposition of specific lots of approved materials in the work shall be established and submitted before completion of the contract.

## SD-04 Samples

Epoxy-Coated Bars

Sample of coating material and 1.5 pounds of patching material shall be submitted with the delivery of the bars.

## SD-06 Test Reports

Material; G|AR

Tests, Inspections, and Verifications; G|AR

Certified tests reports of reinforcement steel showing that the steel complies with the applicable specifications shall be furnished for each steel shipment and identified with specific lots prior to placement. Three copies of the heat analyses shall be provided for each lot of steel furnished and the Contractor shall certify that the steel conforms to the heat analyses.

## SD-07 Certificates

Epoxy-Coated Steel Bars

Written certification for coating material and coated bars shall be submitted with the delivery of the bars.

## Qualification of Steel Bar Butt-Splacers

Certificates on the Qualifications of Steel Bar Butt-Splacers shall be submitted prior to commencing butt-splicing.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

Materials shall conform to the following requirements.

##### 2.1.1 Steel Bars

Steel bars shall comply with the requirements of ASTM A 615/A 615M, deformed, of the grades, sizes and lengths shown.

##### 2.1.1.1 Epoxy-Coated Bars

Epoxy-coated steel bars shall comply with the requirements of ASTM A 775/A 775M, including written certifications for coating material and coated bars, sample of coating material, and 0.5 pounds of patching material.

##### 2.1.1.2 Fabricated Bar Mats

Fabricated bar mats shall comply with the requirements of ASTM A 184/A 184M, clipped or welded mats, bar sizes and spacings as shown.

##### 2.1.2 Steel Welded Wire Fabric

Steel welded wire fabric shall comply with the requirements of ASTM A 185 wire sizes and spacings as shown. For wire with a specified yield strength ( $f_y$ ) exceeding 60,000 psi,  $f_y$  shall be the stress corresponding to a strain of 0.35 percent.

##### 2.1.3 Accessories

##### 2.1.3.1 Bar Supports

Bar supports shall comply with the requirements of ACI 315. Supports for bars in concrete with formed surfaces exposed to view or to be painted shall be plastic-coated wire, stainless steel or precast concrete supports.

Precast concrete supports shall be wedged-shaped, not larger than 3-1/2 by 3-1/2 inches, of thickness equal to that indicated for concrete cover and have an embedded hooked tie-wire for anchorage. Bar supports used in precast concrete with formed surfaces exposed to view shall be the same quality, texture and color as the finish surfaces.

##### 2.1.3.2 Wire Ties

Wire ties shall be 16 gage or heavier black annealed wire. Ties for epoxy-coated bars shall be vinyl-coated or epoxy-coated. Ties for zinc-coated bars shall be zinc-coated.

#### 2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

The Contractor shall have material tests required by applicable standards and specified performed by an approved laboratory and certified to demonstrate that the materials are in conformance with the specifications. Tests, inspections, and verifications shall be performed and certified at the Contractor's expense.

#### 2.2.1 Reinforcement Steel Tests

Mechanical testing of steel shall be in accordance with ASTM A 370 except as otherwise specified or required by the material specifications. Tension tests shall be performed on full cross-section specimens using a gage length that spans the extremities of specimens with welds or sleeves included. Chemical analyses of steel heats shall show the percentages of carbon, phosphorous, manganese, sulphur and silicon present in the steel.

#### 2.2.2 Qualification of Steel Bar Butt-Splacers

Qualification of steel bar butt-splacers shall be certified to have satisfactorily completed a course of instruction in the proposed method of butt-splicing or have satisfactorily performed such work within the preceding year.

#### 2.2.3 Qualification of Butt-Splicing Procedure

As a condition of approval of the butt-splicing procedure, the Contractor, in the presence of the Contracting Officer, shall make three test butt-splices of steel bars of each size to be spliced using the proposed butt-splicing method. These test butt-splices and unspliced bars of the same size shall be tension tested to destruction with stress-strain curves plotted for each test. Test results must show that the butt-splices meet the specified strength and deformation requirements in order for the splicing procedure to be approved.

#### 2.2.4 Radiographic Examination of Welds

Radiographic examination of welds shall be in accordance with ASTM E 94 and shall be performed and evaluated by an approved testing agency adequately equipped to perform such services. Radiographs of welds and evaluations of the radiographs submitted for approval shall become the property of the Government.

### PART 3 EXECUTION

#### 3.1 FABRICATION AND PLACEMENT

Reinforcement steel and accessories shall be fabricated and placed as specified and shown on approved shop drawings. Fabrication and placement details of steel and accessories not specified or shown shall be in accordance with ACI 315 and ACI 318/318R or as directed. Steel shall be fabricated to shapes and dimensions shown, placed where indicated within specified tolerances and adequately supported during concrete placement. At the time of concrete placement all steel shall be free from loose, flaky rust, scale (except tight mill scale), mud, oil, grease or any other

coating that might reduce the bond with the concrete.

### 3.1.1 Hooks and Bends

Steel bars, except for zinc-coated or epoxy-coated, shall be mill or field-bent. Zinc-Coated and epoxy-coated bars shall be mill-bent prior to coating. All steel shall be bent cold unless authorized. No steel bars shall be bent after being partially embedded in concrete unless indicated or authorized.

### 3.1.2 Welding

Welding of steel bars will be permitted only where indicated or authorized.

Welding shall be performed in accordance with AWS D1.4 except where otherwise specified or indicated.

### 3.1.3 Placing Tolerances

#### 3.1.3.1 Spacing

The spacing between adjacent bars and the distance between layers of bars may not vary from the indicated position by more than one bar diameter nor more than 1 inch.

#### 3.1.3.2 Concrete Cover

The minimum concrete cover of main reinforcement steel bars shall be as shown. The allowable variation for minimum cover shall be as follows:

MINIMUM COVER	VARIATION
6 inch	plus 1/2 inch
4 inch	plus 3/8 inch
3 inch	plus 3/8 inch

### 3.1.4 Splicing

Splices in steel bars shall be made only as required. Bars may be spliced at alternate or additional locations at no additional cost to the Government subject to approval.

#### 3.1.4.1 Lap Splices

Lap splices shall be used only for bars smaller than size 14 and welded wire fabric. Lapped bars may be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete. Lapped bars shall not be spaced farther apart than 1/5 the required length of lap or 6 inches.

#### 3.1.4.2 Butt-Splices

Butt-splices shall not be used

-- End of Section --



## SECTION 03300

CAST-IN-PLACE STRUCTURAL CONCRETE  
09/95

## 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 and represent the latest edition in force when this contract is awarded.

## ACI INTERNATIONAL (ACI)

ACI 117/117R	Standard Tolerances for Concrete Construction and Materials
ACI 211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214.3R	Simplified Version of the Recommended Practice for Evaluation of Strength Test Results
ACI 305R	Hot Weather Concreting
ACI 318/318R	Building Code Requirements for Structural Concrete and Commentary

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO M 182	Burlap Cloth Made From Jute or Kenaf
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## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	Making and Curing Concrete Test Specimens in the Field
ASTM C 33	Concrete Aggregates
ASTM C 39	Compressive Strength of Cylindrical Concrete Specimens
ASTM C 42	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 94	Ready-Mixed Concrete

ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 143	Slump of Hydraulic Cement Concrete
ASTM C 150	Portland Cement
ASTM C 171	Sheet Materials for Curing Concrete
ASTM C 172	Sampling Freshly Mixed Concrete
ASTM C 192	Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	Air-Entraining Admixtures for Concrete
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete
ASTM C 618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 881	Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 940	Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory
ASTM C 989	Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
ASTM C 1017	Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C 1059	Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064/C 1064M	Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

ASTM D 75	Sampling Aggregates
CORPS OF ENGINEERS (COE)	
COE CRD-C 94	Surface Retarders
COE CRD-C 104	Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 400	Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 521	Standard Test Method for Frequency and Amplitude of Vibrators for Concrete
COE CRD-C 540	Standard Specification for Nonbituminous Inserts for Contraction Joints in Portland Cement Concrete Airfield Pavements, Sawable Type
COE CRD-C 572	Corps of Engineers Specifications for Polyvinylchloride Waterstop
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)	
NIST HB 44	NIST Handbook 44: Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices
NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)	
NRMCA TMMB-100	Truck Mixer Agitator and Front Discharge Concrete Carrier Standards
NRMCA CPMB 100	Concrete Plant Standards
NRMCA QC 3	Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities

## 1.2 LUMP SUM CONTRACT

Under this type of contract concrete items will be paid for by lump sum and will not be measured. The work covered by these items consists of furnishing all concrete materials, reinforcement, miscellaneous embedded materials, and equipment, and performing all labor for the forming, manufacture, transporting, placing, finishing, curing, and protection of concrete in these structures.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Surface Retarder.

Surface retarder material with manufacturer's instructions for application in conjunction with air-water cutting.

SD-05 Design Data

Mixture Proportions; G ED.

The results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of each strength or class of concrete, at least 14 days prior to commencing concrete placing operations. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. The test results shall be less than 6 months old. No substitutions shall be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory. The mixture proportions submittal shall also include test results for each component of the mix (aggregate, cement, admixtures, etc).

Cold Weather Requirements; G ED

Cold Weather Concreting Plan

Hot Weather Requirements; G ED

Hot Weather Concreting Plan

Willow Street Relief Culvert; G ED

Grouting Plan

SD-06 Test Reports

Testing and Inspection for Contractor Quality Control; G ED.

Certified copies of laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolan, ground granulated blast furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

SD-07 Certificates

Quality Control Qualifications.

Written documentation for Contractor Quality Control personnel.

#### 1.4 QUALITY CONTROL QUALIFICATIONS

Contractor Quality Control personnel assigned to concrete construction shall be American Concrete Institute (ACI) Certified Workmen in one of the following grades or shall have written evidence of having completed similar qualification programs:

Concrete Field Testing Technician, Grade I  
Concrete Laboratory Testing Technician, Grade I or II  
Concrete Construction Inspector, Level II

The foreman or lead journeyman of the flatwork finishing crew shall have similar qualification for ACI Concrete Flatwork Technician/Finisher or equal, with written documentation.

#### 1.5 FIELD TEST PANELS

Field test panels shall be constructed prior to beginning of work using the materials and procedures proposed for use on the job, to demonstrate the results to be attained. The quality and appearance of each panel shall be subject to the approval of the Contracting Officer, and, if not judged satisfactory, additional panels shall be constructed until approval is attained. Formed or finished surfaces in the completed structure shall match the quality and appearance of the approved field example.

##### 1.5.1 Sample Wall Panels

One sample panel at least 10 feet high by 5 feet and 12 inches thick shall be constructed to demonstrate Class A formed finish and smooth, colored, trowel-applied "stucco" finish and includes the reveal pattern as shown for the west abutment of the Courthouse closure. The "stucco" finish shall be colored such that the final cured color closely matches the color of the Courthouse and adjacent stone wall. Contract price shall include up to four complete applications of colored "stucco" finish for selection purposes. Panels shall be located as directed by the Contracting Officer. Each panel shall include a full length and full width joint line and shall have at least two voids each at least 12 inches by 12 inches by 3 inches deep either impressed in the concrete as placed or chipped in the hardened concrete. After the concrete is 7 days old, the voids shall be patched to demonstrate the effectiveness and the appearance of the Contractor's repair procedures.

#### 1.6 SPECIAL REQUIREMENTS

A pre-installation meeting with the Contracting Officer will be required at least 10 days prior to start of construction. The Contractor shall be responsible for calling the meeting; the Project Superintendent and active installation personnel shall be present.

## 1.7 GENERAL REQUIREMENTS

## 1.7.1 Tolerances

Except as otherwise specified herein, tolerances for concrete batching, mixture properties, and construction as well as definition of terms and application practices shall be in accordance with ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing; when forms or shoring are used, the measurements shall be made prior to removal.

## 1.7.2 Strength Requirements and w/c Ratio

## 1.7.2.1 Strength Requirements

Specified compressive strength (f'c) shall be as follows:

COMPRESSIVE STRENGTH	STRUCTURE OR PORTION OF STRUCTURE
see req'd mix below	grout for pipes less than 24" dia.
2000 psi at 28 days	lean concrete
4000 psi at 28 days	all other concrete

Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II portland cement. Compressive strength shall be determined in accordance with ASTM C 39.

- a. Evaluation of Concrete Compressive Strength. Compressive strength specimens (6 by 12 inch cylinders) shall be fabricated by the Contractor and laboratory cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.
- b. Investigation of Low-Strength Compressive Test Results. When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member

or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the strength of the structure.

Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. Non-destructive tests (tests other than test cylinders or cores) shall not be used as a basis for acceptance or rejection. The Contractor shall perform the coring, test the cores, and repair the holes unless otherwise indicated by the Contracting Officer.

- c. Load Tests. If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test as being under strength shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies shall be performed by and at the expense of the Contractor and must be approved by the Contracting Officer, except that if all concrete is found to be in compliance with the drawings and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.7.2.2 Water-Cement Ratio

Maximum water-cement ratio (w/c) for normal weight concrete shall be as follows:

WATER-CEMENT RATIO, BY WEIGHT	STRUCTURE OR PORTION OF STRUCTURE
0.45	all concrete other than lean concrete

These w/c's may cause higher strengths than that required above for compressive or flexural strength. The maximum w/c required will be the equivalent w/c as determined by conversion from the weight ratio of water to cement plus pozzolan, and ground granulated blast furnace slag (GGBF slag) by the weight equivalency method as described in ACI 211.1. In the case where silica fume or GGBF slag is used, the weight of the silica fume and GGBF slag shall be included in the equations of ACI 211.1 for the term P which is used to denote the weight of pozzolan.

1.7.3 Air Entrainment

All normal weight concrete shall be air entrained to contain between 5 and 7 percent total air, except that when the nominal maximum size coarse aggregate is 3/4 inch or smaller it shall be between 5.5 and 7.5 percent. Concrete with specified strength over 5000 psi may have 1.0 percent less air than specified above. Specified air content shall be attained at point of placement into the forms. Air content for normal weight concrete shall

be determined in accordance with ASTM C 231.

#### 1.7.4 Slump

Slump of the concrete, as delivered to the point of placement into the forms, shall be within the following limits. Slump shall be determined in accordance with ASTM C 143.

Structural Element	Slump	
	Minimum	Maximum
a. Walls	2 in.	4 in.
b. Foundation slabs, footings	1 in.	3 in.
c. Any structural concrete approved for placement by pumping:		
At pump	2 in.	6 in.
At discharge of line	1 in.	4 in.

When use of a plasticizing admixture conforming to ASTM C 1017 or when a Type F or G high range water reducing admixture conforming to ASTM C 494 is permitted to increase the slump of concrete, concrete shall have a slump in accordance with above items a and b before the admixture is added and a maximum slump of 8 inches at the point of delivery after the admixture is added.

#### 1.7.5 Concrete Temperature Control

The temperature of the concrete as delivered shall not exceed 90 degrees F. When the ambient temperature during placing is 40 degrees F or less, or is expected to be at any time within 6 hours after placing, the temperature of the concrete as delivered shall be between 55 and 75 degrees F.

#### 1.7.6 Size of Coarse Aggregate

The largest feasible nominal maximum size aggregate (NMSA) specified in paragraph AGGREGATES shall be used in each placement. However, nominal maximum size of aggregate shall not exceed any of the following: three-fourths of the minimum cover for reinforcing bars, three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

#### 1.7.7 Special Properties and Products

Concrete may contain admixtures other than air entraining agents, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if specified or approved. Any of these materials to be used on the project shall be used in the mix design studies.

#### 1.7.8 Technical Service for Specialized Concrete

The services of a factory trained technical representative shall be obtained to oversee proportioning, batching, mixing, placing, consolidating, and finishing of specialized structural concrete, such as flowing concrete. The technical representative shall be on the job full time until the Contracting Officer is satisfied that field controls indicate concrete of specified quality is furnished and that the Contractor's crews are capable of continued satisfactory work. The technical representative shall be available for consultation with, and advice to, Government forces.

#### 1.8 MIXTURE PROPORTIONS

Concrete shall be composed of portland cement, other cementitious and pozzolanic materials as specified, aggregates, water and admixtures as specified.

##### 1.8.1 Proportioning Studies for Normal Weight Concrete

Trial design batches, mixture proportioning studies, and testing requirements for various classes and types of concrete specified shall be the responsibility of the Contractor. Except as specified for flexural strength concrete, mixture proportions shall be based on compressive strength as determined by test specimens fabricated in accordance with ASTM C 192 and tested in accordance with ASTM C 39. Samples of all materials used in mixture proportioning studies shall be representative of those proposed for use in the project and shall be accompanied by the manufacturer's or producer's test reports indicating compliance with these specifications. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios for each type of mixture, which will produce a range of strength encompassing those required for each class and type of concrete required on the project. The maximum water-cement ratios required in subparagraph Water-Cement Ratio will be the equivalent water-cement ratio as determined by conversion from the weight ratio of water to cement plus pozzolan, silica fume, and ground granulated blast furnace slag (GGBF slag) by the weight equivalency method as described in ACI 211.1. In the case where silica fume or GGBF slag is used, the weight of the silica fume and GGBF slag shall be included in the equations in ACI 211.1 for the term P, which is used to denote the weight of pozzolan. If pozzolan is used in the concrete mixture, the minimum pozzolan content shall be 15 percent by weight of the total cementitious material, and the maximum shall be 35 percent. Laboratory trial mixtures shall be designed for maximum permitted slump and air content. Separate sets of trial mixture studies shall be made for each combination of cementitious materials and each combination of admixtures proposed for use.

No combination of either shall be used until proven by such studies, except that, if approved in writing and otherwise permitted by these specifications, an accelerator or a retarder may be used without separate trial mixture study. Separate trial mixture studies shall also be made for concrete for any conveying or placing method proposed which requires special properties and for concrete to be placed in unusually difficult placing locations. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192.

They shall be tested at 7 and 28 days in accordance with ASTM C 39. From these test results, a curve shall be plotted showing the relationship between water-cement ratio and strength for each set of trial mix studies. In addition, a curve shall be plotted showing the relationship between 7 day and 28 day strengths. Each mixture shall be designed to promote easy and suitable concrete placement, consolidation and finishing, and to prevent segregation and excessive bleeding.

#### 1.8.2 Grout for pipes less than 24 inch diameter

Grout shall be a modified neat cement grout mixed in the proportion of one 94-pound bag of Type II Portland cement, four to five pounds of minus 200-sieve bentonite powder, and six to seven gallons of clean, potable water. Cement shall meet the requirements of ASTM C 150.

#### 1.8.3 Average Compressive Strength Required for Mixtures

The mixture proportions selected during mixture design studies shall produce a required average compressive strength ( $f'_{cr}$ ) exceeding the specified compressive strength ( $f'_c$ ) by the amount indicated below. This required average compressive strength,  $f'_{cr}$ , will not be a required acceptance criteria during concrete production. However, whenever the daily average compressive strength at 28 days drops below  $f'_{cr}$  during concrete production, or daily average 7-day strength drops below a strength correlated with the 28-day  $f'_{cr}$ , the mixture shall be adjusted, as approved, to bring the daily average back up to  $f'_{cr}$ . During production, the required  $f'_{cr}$  shall be adjusted, as appropriate, based on the standard deviation being attained on the job.

##### 1.8.3.1 Computations from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214.3R. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected; shall represent concrete produced to meet a specified strength or strengths ( $f'_c$ ) within 1,000 psi of that specified for proposed work; and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. Required average compressive strength  $f'_{cr}$  used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

$$f'_{cr} = f'_c + 1.34S \text{ where units are in psi}$$

$$f'_{cr} = f'_c + 2.33S - 500 \text{ where units are in psi}$$

Where  $S$  = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following

table:

NUMBER OF TESTS	MODIFICATION FACTOR FOR STANDARD DEVIATION
15	1.16
20	1.08
25	1.03
30 or more	1.00

#### 1.8.3.2 Computations without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength  $f'_{cr}$  shall be determined as follows:

- a. If the specified compressive strength  $f'_c$  is less than 3,000 psi,  
 $f'_{cr} = f'_c + 1000 \text{ psi}$
- b. If the specified compressive strength  $f'_c$  is 3,000 to 5,000 psi,  
 $f'_{cr} = f'_c + 1,200 \text{ psi}$
- c. If the specified compressive strength  $f'_c$  is over 5,000 psi,  
 $f'_{cr} = f'_c + 1,400 \text{ psi}$

#### 1.9 STORAGE OF MATERIALS

Cement and other cementitious materials shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants and keep each material completely separated. Aggregate stockpiles shall be arranged and used in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Aggregate shall not be stored directly on ground unless a sacrificial layer is left undisturbed. Reinforcing bars and accessories shall be stored above the ground on platforms, skids or other supports. Other materials shall be stored in such a manner as to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing shall not be used unless retested and proven to meet the specified requirements. Materials shall be capable of being accurately identified after bundles or containers are opened.

#### 1.10 GOVERNMENT ASSURANCE INSPECTION AND TESTING

Day-to day inspection and testing shall be the responsibility of the Contractor Quality Control (CQC) staff. However, representatives of the Contracting Officer can and will inspect construction as considered appropriate and will monitor operations of the Contractor's CQC staff. Government inspection or testing will not relieve the Contractor of any of his CQC responsibilities.

### 1.10.1 Materials

The Government will sample and test aggregates, cementitious materials, other materials, and concrete to determine compliance with the specifications as considered appropriate. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Other materials will be sampled from storage at the jobsite or from other locations as considered appropriate. Samples may be placed in storage for later testing when appropriate.

### 1.10.2 Fresh Concrete

Fresh concrete will be sampled as delivered in accordance with ASTM C 172 and tested in accordance with these specifications, as considered necessary.

### 1.10.3 Hardened Concrete

Tests on hardened concrete will be performed by the Government when such tests are considered necessary.

### 1.10.4 Inspection

Concrete operations may be tested and inspected by the Government as the project progresses. Failure to detect defective work or material will not prevent rejection later when a defect is discovered nor will it obligate the Government for final acceptance.

## PART 2 PRODUCTS

### 2.1 CEMENTITIOUS MATERIALS

Cementitious Materials shall be portland cement, or portland cement in combination with pozzolan or ground granulated blast furnace slag and shall conform to appropriate specifications listed below. Use of cementitious materials in concrete which will have surfaces exposed in the completed structure shall be restricted so there is no change in color, source, or type of cementitious material.

#### 2.1.1 Portland Cement

ASTM C 150, Type II low alkali including false set requirements. The alkali content shall not exceed 0.6 percent. (In lieu of the low alkali cement, a mix design utilizing flyash or GGBF and regular Type II cement is acceptable as long as it can be demonstrated in the Mortar Bar Test (ASTM C 441) that the expansion at 14 days of the cement/flyash or GGBF mix is less than or equal to the expansion of the low alkali cement mix.) White Type III shall be used only in specific areas of the structure, when approved in writing.

#### 2.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III with tricalcium aluminate limited to 5 percent, low

alkali. Type III cement shall be used only in isolated instances and only when approved in writing.

#### 2.1.3 Pozzolan (Fly Ash)

ASTM C 618, Class C or F with the optional requirements for multiple factor, drying shrinkage, and uniformity from Table 2A of ASTM C 618. Requirement for maximum alkalies from Table 1A of ASTM C 618 shall apply. If pozzolan is used, it shall never be less than 15 percent nor more than 35 percent by weight of the total cementitious material. Fly ash shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS

#### 2.1.4 Ground Granulated Blast-Furnace (GGBF) Slag

ASTM C 989, Grade 120.

### 2.2 AGGREGATES

Aggregates shall conform to the following.

#### 2.2.1 Fine Aggregate

Fine aggregate shall conform to the quality and gradation requirements of ASTM C 33.

#### 2.2.2 Coarse Aggregate

Coarse aggregate shall conform to ASTM C 33, Class 5S, size designation number 57.

### 2.3 CHEMICAL ADMIXTURES

Chemical admixtures, when required or permitted, shall conform to the appropriate specification listed. Admixtures shall be furnished in liquid form and of suitable concentration for easy, accurate control of dispensing.

#### 2.3.1 Air-Entraining Admixture

ASTM C 260 and shall consistently entrain the air content in the specified ranges under field conditions.

#### 2.3.2 Accelerating Admixture

ASTM C 494, Type C or E, except that calcium chloride or admixtures containing calcium chloride shall not be used.

#### 2.3.3 Water-Reducing or Retarding Admixture

ASTM C 494, Type A, B, or D, except that the 6-month and 1-year compressive and flexural strength tests are waived.

#### 2.3.4 High-Range Water Reducer

ASTM C 494, Type F or G, except that the 6-month and 1-year strength requirements are waived. The admixture shall be used only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

#### 2.3.5 Surface Retarder

COE CRD-C 94.

#### 2.3.6 Other Chemical Admixtures

Chemical admixtures for use in producing flowing concrete shall comply with ASTM C 1017, Type I or II. These admixtures shall be used only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

### 2.4 CURING MATERIALS

#### 2.4.1 Impervious-Sheet

Impervious-sheet materials shall conform to ASTM C 171, type optional, except, that polyethylene sheet shall not be used.

#### 2.4.2 Membrane-Forming Compound

Membrane-Forming curing compound shall conform to ASTM C 309, Type 1-D or 2, except that only a styrene acrylate or chlorinated rubber compound meeting Class B requirements shall be used for surfaces that are to be painted or are to receive bituminous roofing, or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing, or flooring specified. Nonpigmented compound shall contain a fugitive dye, and shall have the reflective requirements in ASTM C 309 waived.

#### 2.4.3 Burlap and Cotton Mat

Burlap and cotton mat used for curing shall conform to AASHTO M 182.

### 2.5 WATER

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, or alkali, except that non-potable water may be used if it meets the requirements of COE CRD-C 400.

### 2.6 NONSHRINK GROUT

Nonshrink grout shall conform to ASTM C 1107, Grade B and shall be a commercial formulation suitable for the proposed application.

### 2.7 NONSLIP SURFACING MATERIAL

Nonslip surfacing material shall consist of 55 percent, minimum, aluminum oxide or silicon-dioxide abrasive ceramically bonded together to form a homogeneous material sufficiently porous to provide a good bond with portland cement paste; or factory-graded emery aggregate consisting of not less than 45 percent aluminum oxide and 25 percent ferric oxide. The aggregate shall be well graded from particles retained on the No. 30 sieve to particles passing the No. 8 sieve.

## 2.8 LATEX BONDING AGENT

Latex agents for bonding fresh to hardened concrete shall conform to ASTM C 1059.

## 2.9 EPOXY RESIN

Epoxy resins for use in repairs shall conform to ASTM C 881, Type V, Grade 2. Class as appropriate to the existing ambient and surface temperatures.

## 2.10 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application.

## 2.11 JOINT MATERIALS

### 2.11.1 Joint Fillers, Sealers, and Waterstops

Expansion joint fillers shall be in accordance with Section 03151A EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

Materials for waterstops shall be in accordance with Section 03151A EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

Materials for and sealing of joints shall conform to the requirements of Section 03151A EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

### 2.11.2 Contraction Joints in Slabs

Sawable type contraction joint inserts shall conform to COE CRD-C 540. Nonsawable joint inserts shall have sufficient stiffness to permit placement in plastic concrete without undue deviation from a straight line and shall conform to the physical requirements of COE CRD-C 540, with the exception of Section 3.4 "Resistance to Sawing". Plastic inserts shall be polyvinyl chloride conforming to the materials requirements of COE CRD-C 572.

## PART 3 EXECUTION

### 3.1 PREPARATION FOR PLACING

Before commencing concrete placement, the following shall be performed. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Forms shall be in place, cleaned, coated, and adequately supported, in accordance with Section 03100 STRUCTURAL CONCRETE FORMWORK. Reinforcing steel shall be in place, cleaned, tied, and adequately supported, in accordance with Section 03201 STEEL BARS AND WELDED WIRE

FABRIC FOR CONCRETE REINFORCEMENT FOR CIVIL WORKS. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition and in sufficient amount for the entire placement. When hot, windy conditions during concreting appear probable, equipment and material shall be at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete.

### 3.1.1 Foundations

#### 3.1.1.1 Concrete on Earth Foundations

Earth (subgrade, base, or subbase courses) surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth shall be well drained and shall be satisfactorily graded and uniformly compacted.

#### 3.1.1.2 Excavated Surfaces in Lieu of Forms

Concrete for footings may be placed directly against the soil provided the earth or rock has been carefully trimmed, is uniform and stable, and meets the compaction requirements of Section 02331 LEVEE EMBANKMENT CONSTRUCTION AND BACKFILLING FOR CLOSURE STRUCTURE. The concrete shall be placed without becoming contaminated by loose material, and the outline of the concrete shall be within the specified tolerances.

### 3.1.2 Previously Placed Concrete

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next horizontal lift by cleaning the construction joint surface with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Concrete at the side of vertical construction joints shall be prepared as approved by the Contracting Officer. Air-water cutting shall not be used on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean surfaces of well bonded coarse aggregate are exposed and make up at least 10-percent of the surface area, distributed uniformly throughout the surface. The edges of the coarse aggregate shall not be undercut. The surface of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing fresh concrete. The surface shall be washed completely clean as the last operation prior to placing the next lift. When bonding to existing concrete, a grout of cement and water shall be scrubbed with a brush into the surfaces to which the new material is to be bonded (after cleaning as discussed above). The area shall be damp but without free water when the grout is applied. As an alternative to the grout, a 10- to 20- mil thick film of epoxy resin grout may be applied to the cleaned existing concrete. The epoxy resin shall conform to paragraph 2.9 EPOXY RESIN and be placed in strict accordance with the manufacturers

instructions.

#### 3.1.2.1 Air-Water Cutting

Air-water cutting of a fresh concrete surface shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 100 psi plus or minus, 10 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a surface retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift in order to prolong the period of time during which air-water cutting is effective. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure waterjet or sandblasting shall be used as the last operation before placing the next lift.

#### 3.1.2.2 High-Pressure Water Jet

A stream of water under a pressure of not less than 3,000 psi shall be used for cutting and cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse-aggregate particles. If the waterjet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

#### 3.1.2.3 Wet Sandblasting

Wet sandblasting shall be used after the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. After wet sandblasting, the surface of the concrete shall then be washed thoroughly to remove all loose materials.

#### 3.1.2.4 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

#### 3.1.2.5 Preparation of Previously Placed Concrete

Concrete surfaces to which other concrete is to be bonded shall be abraded in an approved manner that will expose sound aggregate uniformly without damaging the concrete. Laitance and loose particles shall be removed. Surfaces shall be thoroughly washed and shall be moist but without free water when concrete is placed.

#### 3.1.3 Perimeter Insulation

Perimeter insulation shall be installed at locations indicated. Adhesive shall be used where insulation is applied to the interior surface of

foundation walls and may be used for exterior application.

#### 3.1.4 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items shall be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding shall not be performed on embedded metals within 1 feet of the surface of the concrete. Tack welding shall not be performed on or to embedded items.

### 3.2 CONCRETE PRODUCTION

#### 3.2.1 Batching, Mixing, and Transporting Concrete

Concrete shall be furnished from a ready-mixed concrete plant. Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and nonagitating transporting units shall comply with NRMCA TMMB-100. Ready-mix concrete plant equipment and facilities shall be certified in accordance with NRMCA QC 3. Approved batch tickets shall be furnished for each load of ready-mixed concrete.

##### 3.2.1.1 General

The batching plant shall be located off site close to the project. The batching plant shall conform to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

##### 3.2.1.2 Batching Equipment

The batching controls shall be semiautomatic or automatic, as defined in NRMCA CPMB 100. A semiautomatic batching system shall be provided with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. The weight of water and admixtures shall be recorded if batched by weight. Separate bins or compartments shall be provided for each size group of aggregate and type of cementitious material, to prevent intermingling at any time. Aggregates shall be weighed either in separate weigh batchers with individual scales or, provided the smallest size is batched first, cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cementitious material. If both portland cement and other cementitious material are used, they may be batched cumulatively, provided that the portland cement is batched first. Water may be measured by weight or volume. Water shall not be weighed or measured cumulatively with another ingredient. Filling and discharging valves for the water metering or batching system shall be so interlocked that the discharge valve cannot be

opened before the filling valve is fully closed. Piping for water and for admixtures shall be free from leaks and shall be properly valved to prevent backflow or siphoning. Admixtures shall be furnished as a liquid of suitable concentration for easy control of dispensing. An adjustable, accurate, mechanical device for measuring and dispensing each admixture shall be provided. Each admixture dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and individually discharged automatically in a manner to obtain uniform distribution throughout the water as it is added to the batch in the specified mixing period. When use of truck mixers makes this requirement impractical, the admixture dispensers shall be interlocked with the sand batchers. Different admixtures shall not be combined prior to introduction in water and shall not be allowed to intermingle until in contact with the cement. Admixture dispensers shall have suitable devices to detect and indicate flow during dispensing or have a means for visual observation. The plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment, and for sampling and calibrating the dispensing of cementitious material, water, and admixtures. Filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.2.1.3 Scales

The weighing equipment shall conform to the applicable requirements of CPMB Concrete Plant Standard, and of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. The tests shall be made at the specified frequency in the presence of a Government inspector. The weighing equipment shall be arranged so that the plant operator can conveniently observe all dials or indicators.

3.2.1.4 Batching Tolerances

(A) Tolerances with Weighing Equipment

MATERIAL	PERCENT OF REQUIRED WEIGHT
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

(B) Tolerances with Volumetric Equipment

For volumetric batching equipment used for water and admixtures, the following tolerances shall apply to the required volume of material being batched:

MATERIAL	PERCENT OF REQUIRED MATERIAL
Water:	plus or minus 1 percent
Chemical admixtures:	0 to plus 6 percent

#### 3.2.1.5 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the weights of the materials being batched.

#### 3.2.1.6 Concrete Mixers

Mixers shall be stationary mixers or truck mixers. Mixers shall be capable of combining the materials into a uniform mixture and of discharging this mixture without segregation. The mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

#### 3.2.1.7 Stationary Mixers

Concrete plant mixers shall be drum-type mixers of tilting, nontilting, horizontal-shaft, or vertical-shaft type, or shall be pug mill type and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94 applicable to central-mixed concrete.

#### 3.2.1.8 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it is possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed. Or, if approved in lieu of this, the number of revolutions shall be marked on the batch tickets. Water shall not be added at the placing site unless specifically approved; and in no case shall it exceed the specified w/c. Any such water shall be injected at the base of the mixer, not at the discharge end.

### 3.3 WILLOW STREET RELIEF CULVERT GROUTING

#### 3.3.1 PREPARATION FOR GROUTING WITH LEAN CONCRETE

Grouting Plan: Prior to grouting center conduit with lean concrete, the Contractor shall submit to the Contracting Officer for approval, plan for

bulkheading, grouting, and measurement of grout and pipe volume. The Contractor shall calculate the volume of pipe to be grouted. The Contractor may drill from the surface into the top of the pipe and utilize grout tubes for pressure injection, but not without specific prior approval of the Contracting Officer.

### 3.3.2 BULKHEADS

Pipes shall be prepared for grouting with lean concrete by bulkheading the ends. For pipes to be grouted by manual entry, one end shall be bulkheaded, and the other end shall be bulkheaded when the pipe grouting is near completion. For pipes to be filled by pumping without manual entry, the line shall be bulkheaded at both ends, or satisfactorily bulkheaded within the pipe at the specified limit.

a. The Contractor may provide an opening in the bulkhead for grout injection and for verification of filling of the pipe.

b. The bulkhead may be a temporary bulkhead on the landside, but must be permanent on the riverside.

### 3.3.3 GROUTING WITH LEAN CONCRETE FILL

#### 3.3.3.1 REQUIREMENTS

The center conduit shall be filled to a volume of no less than 95% of the full volume of the pipe for the length to be filled. There shall be no continuous void extending from one end to the other end (such as along the top). The Contractor shall include in his plan, the method of inspection to assure the complete filling of the pipe.

#### 3.3.3.2 VOLUME VERIFICATION

The Contractor will report the quantity of the mix actually used in the grouting and compare against the calculated volume of the pipe. If the volume used is less than 95% of the calculated volume of the pipes, the Contractor will be required to drill and insert additional tubes into the pipe and grout the remaining voids.

#### 3.3.3.3 SAMPLES

The Contractor shall take cylinder samples for test breaks to verify that the concrete meets the required compressive strength, at no less than three (3) test cylinders per pipe section grouted.

### 3.4 TRANSPORTING CONCRETE TO PROJECT SITE

Concrete shall be transported to the placing site in truck mixers conforming to NRMCA TMMB-100.

### 3.5 CONVEYING CONCRETE ON SITE

Concrete shall be conveyed from mixer or transporting unit to forms as

rapidly as possible and within the time interval specified by methods which will prevent segregation or loss of ingredients using following equipment. Conveying equipment shall be cleaned before each placement.

#### 3.5.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least 5 times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 2 square feet. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 2 cubic yards shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

#### 3.5.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and shall have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

#### 3.5.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94.

#### 3.5.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes normally attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete.

#### 3.5.5 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means, such as discharge baffle or hopper, for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 36 inches. The belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant truck that is long enough to extend through the reinforcing bars.

### 3.5.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure type; pneumatic placing equipment shall not be used. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least 3 times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 4 inches. Aluminum pipe shall not be used.

### 3.6 PLACING CONCRETE

Mixed concrete shall be discharged within 1-1/2 hours or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the concrete temperature exceeds 85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed within 15 minutes after it has been discharged from the transporting unit. Concrete shall be handled from mixer or transporting unit to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Sufficient placing capacity shall be provided so that concrete can be kept free of cold joints.

#### 3.6.1 Depositing Concrete

Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 12 inches thick, except that all slabs shall be placed in a single layer. Concrete to receive other construction shall be screeded to the proper level. Concrete shall be deposited continuously in one layer or in layers so that fresh concrete is deposited on in-place concrete that is still plastic. Fresh concrete shall not be deposited on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section. Concrete that has surface dried, partially hardened, or contains foreign material shall not be used. When temporary spreaders are used in the forms, the spreaders shall be removed as their service becomes unnecessary. Concrete shall not be placed in slabs over columns and walls until concrete in columns and walls has been in-place at least two hours or until the concrete begins to lose its plasticity. Concrete for beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as concrete for adjoining slabs.

#### 3.6.2 Consolidation

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs 4 inches thick or less. The vibrators

shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 10,000 vibrations per minute, an amplitude of at least 0.025 inch, and the head diameter shall be appropriate for the structural member and the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then vertically withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique. Frequency and amplitude of vibrators shall be determined in accordance with COE CRD-C 521. Grate tampers ("jitterbugs") shall not be used.

#### 3.6.3 Cold Weather Requirements

Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. The temperature of the concrete when placed shall be not less than 50 degrees F nor more than 75 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the concrete to prevent freezing. Upon written approval, an accelerating admixture conforming to ASTM C 494, Type C or E may be used, provided it contains no calcium chloride. Calcium chloride shall not be used.

#### 3.6.4 Hot Weather Requirements

When the ambient temperature during concrete placing is expected to exceed 85 degrees F, the concrete shall be placed and finished with procedures previously submitted and as specified herein. The concrete temperature at time of delivery to the forms shall not exceed the temperature shown in the table below when measured in accordance with ASTM C 1064/C 1064M. Cooling of the mixing water or aggregates or placing concrete in the cooler part of the day may be required to obtain an adequate placing temperature. A retarder may be used, as approved, to facilitate placing and finishing. Steel forms and reinforcements shall be cooled as approved prior to concrete placement when steel temperatures are greater than 120 degrees F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

Maximum Allowable Concrete Placing Temperature

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Relative Humidity, Percent, During Time of Concrete Placement	Maximum Allowable Concrete Temperature Degrees
Greater than 60	90 F
40-60	85 F
Less than 40	80 F

### 3.6.5 Prevention of Plastic Shrinkage Cracking

During hot weather with low humidity, and particularly with appreciable wind, as well as interior placements when space heaters produce low humidity, the Contractor shall be alert to the tendency for plastic shrinkage cracks to develop and shall institute measures to prevent this. Particular care shall be taken if plastic shrinkage cracking is potentially imminent and especially if it has developed during a previous placement. Periods of high potential for plastic shrinkage cracking can be anticipated by use of Fig. 2.1.5 of ACI 305R. In addition the concrete placement shall be further protected by erecting shades and windbreaks and by applying fog sprays of water, sprinkling, ponding or wet covering. Plastic shrinkage cracks that occur shall be filled by injection of epoxy resin as directed, after the concrete hardens. Plastic shrinkage cracks shall never be troweled over or filled with slurry.

### 3.6.6 Placing Concrete in Congested Areas

Special care shall be used to ensure complete filling of the forms, elimination of all voids, and complete consolidation of the concrete when placing concrete in areas congested with reinforcing bars, embedded items, waterstops and other tight spacing. An appropriate concrete mixture shall be used, and the nominal maximum size of aggregate (NMSA) shall meet the specified criteria when evaluated for the congested area. Vibrators with heads of a size appropriate for the clearances available shall be used, and the consolidation operation shall be closely supervised to ensure complete and thorough consolidation at all points. Where necessary, splices of reinforcing bars shall be alternated to reduce congestion. Where two mats of closely spaced reinforcing are required, the bars in each mat shall be placed in matching alignment to reduce congestion. Reinforcing bars may be temporarily crowded to one side during concrete placement provided they are returned to exact required location before concrete placement and consolidation are completed.

### 3.6.7 Placing Flowable Concrete

If a plasticizing admixture conforming to ASTM C 1017 is used or if a Type F or G high range water reducing admixture is permitted to increase the slump, the concrete shall meet all requirements of paragraph GENERAL REQUIREMENTS in PART 1. Extreme care shall be used in conveying and placing the concrete to avoid segregation. Consolidation and finishing

shall meet all requirements of paragraphs Placing Concrete, Finishing Formed Surfaces, and Finishing Unformed Surfaces. No relaxation of requirements to accommodate flowable concrete will be permitted.

### 3.7 JOINTS

Joints shall be located and constructed as indicated or approved. Joints not indicated on the drawings shall be located and constructed to minimize the impact on the strength of the structure. In general, such joints shall be located near the middle of the spans of supported slabs, beams, and girders unless a beam intersects a girder at this point, in which case the joint in the girder shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and at the tops of footings, unless otherwise approved. Joints shall be perpendicular to the main reinforcement. All reinforcement shall be continued across joints; except that reinforcement or other fixed metal items shall not be continuous through expansion joints, or through construction or contraction joints in slabs on grade. Reinforcement shall be 2 inches clear from each joint. Except where otherwise indicated, construction joints between interior slabs on grade and vertical surfaces shall consist of 30 pound asphalt-saturated felt, extending for the full depth of the slab. The perimeters of the slabs shall be free of fins, rough edges, spalling, or other unsightly appearance. Reservoir for sealant for construction and contraction joints in slabs shall be formed to the dimensions shown on the drawings by removing snap-out joint-forming inserts, by sawing sawable inserts, or by sawing to widen the top portion of sawed joints. Joints to be sealed shall be cleaned and sealed as indicated and in accordance with Section 03151 EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

#### 3.7.1 Construction Joints

Construction joints shall be located as indicated or approved. Concrete shall be placed continuously so that each unit is monolithic in construction. Fresh concrete shall not be placed against adjacent hardened concrete until it is at least 24 hours old. Construction joints shall be located as indicated or approved. Where concrete work is interrupted by weather, end of work shift or other similar type of delay, location and type of construction joint shall be subject to approval of the Contracting Officer. Unless otherwise indicated and except for slabs on grade, reinforcing steel shall extend through construction joints. Construction joints in slabs on grade shall be keyed or doweled as shown. Concrete columns, walls, or piers shall be in place at least 2 hours, or until the concrete begins to lose its plasticity, before placing concrete for beams, girders, or slabs thereon. In walls having door or window openings, lifts shall terminate at the top and bottom of the opening. Other lifts shall terminate at such levels as to conform to structural requirements or architectural details. Where horizontal construction joints in walls or columns are required, a strip of 1 inch square-edge lumber, bevelled and oiled to facilitate removal, shall be tacked to the inside of the forms at the construction joint. Concrete shall be placed to a point 1 inch above the underside of the strip. The strip shall be removed 1 hour after the concrete has been placed, and any irregularities in the joint line shall be leveled off with a wood float, and all laitance shall be removed. Prior to

placing additional concrete, horizontal construction joints shall be prepared as specified in paragraph Previously Placed Concrete.

### 3.7.2 Expansion Joints

Installation of expansion joints and sealing of these joints shall conform to the requirements of Section 03151 EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

### 3.7.3 Waterstops

Waterstops shall be installed in conformance with the locations and details shown on the drawings using materials and procedures specified in Section 03151 EXPANSION, CONTRACTION, AND CONTRACTION JOINTS IN CONCRETE FOR CIVIL WORKS.

### 3.7.4 Dowels and Tie Bars

Dowels and tie bars shall be installed at the locations shown on the drawings and to the details shown, using materials and procedures specified in Section 03201 STEEL BARS AND WELDED WIRE FABRIC FOR CONCRETE REINFORCEMENT FOR CIVIL WORKS and herein. Conventional smooth "paving" dowels shall be installed in slabs using approved methods to hold the dowel in place during concreting within a maximum alignment tolerance of 1/8 inch in 12 inches. "Structural" type deformed bar dowels, or tie bars, shall be installed to meet the specified tolerances. Care shall be taken during placing adjacent to and around dowels and tie bars to ensure there is no displacement of the dowel or tie bar and that the concrete completely embeds the dowel or tie bar and is thoroughly consolidated.

## 3.8 FINISHING FORMED SURFACES

Forms, form materials, and form construction are specified in Section 03100 STRUCTURAL CONCRETE FORMWORK. Finishing of formed surfaces shall be as specified herein. Surfaces not exposed to view shall be left with the texture imparted by the forms except that defective surfaces shall be repaired. Unless painting of surfaces is required, uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that requires a Class A or B finish. Except for major defects, as defined hereinafter, surface defects shall be repaired as specified herein within 24 hours after forms are removed. Repairs of the so-called "plaster-type" will not be permitted in any location. Tolerances of formed surfaces shall conform to the requirements of ACI 117/117R. These tolerances apply to the finished concrete surface, not to the forms themselves; forms shall be set true to line and grade. Form tie holes requiring repair and other defects whose depth is at least as great as their surface diameter shall be repaired as specified in paragraph Damp-Pack Mortar Repair. Defects whose surface diameter is greater than their depth shall be repaired as specified in paragraph Repair of Major Defects. Repairs shall be finished flush with adjacent surfaces and with the same surface texture. The cement used for all repairs shall be a blend of job cement with white cement proportioned so that the final color after curing and aging will be the same as the adjacent concrete. Concrete with excessive honeycomb, or other defects

which affect the strength of the member, will be rejected. Repairs shall be demonstrated to be acceptable and free from cracks or loose or drummy areas at the completion of the contract and, for Class A and B Finishes, shall be inconspicuous. Repairs not meeting these requirements will be rejected and shall be replaced.

#### 3.8.1 Class A Finish

Class A finish is required for all concrete surfaces exposed to view. Fins, ravelings, and loose material shall be removed, all surface defects over 1/2 inch in diameter or more than 1/2 inch deep, shall be repaired and, except as otherwise indicated or as specified in Section 03100 STRUCTURAL CONCRETE FORMWORK, holes left by removal of form ties shall be reamed and filled. Defects more than 1/2 inch in diameter shall be cut back to sound concrete, but in all cases at least 1 inch deep. For the Courthouse Closure, the Contractor shall prepare a sample panel for approval (as specified in PART 1) before commencing repair, showing that the surface texture and color match will be attained. Metal tools shall not be used to finish repairs in Class A surfaces.

#### 3.8.2 Class C Finish

Class C finish is required for all concrete surfaces below grade or not exposed to view. Fins, ravelings, and loose material shall be removed, and, except as otherwise indicated or as specified in Section 03100 STRUCTURAL CONCRETE FORMWORK, holes left by removal of form ties shall be reamed and filled. Honeycomb and other defects more than 1/2 inch deep or more than 2 inches in diameter shall be repaired. Defects more than 2 inches in diameter shall be cut back to sound concrete, but in all cases at least 1 inch deep.

#### 3.8.3 Colored "Stucco" Finish for Courthouse Closure

After other concrete construction is complete in each overall separate contiguous area of the structure and all repairs have been performed, smooth colored "stucco" finish shall be applied to all concrete surfaces exposed to view, not including the concrete sill. A mortar formulation consisting of portland cements, graded aggregates, mineral oxide pigments and specific additives, shall be used. Where the finished wall surface is exposed to view, the mortar mix shall be colored to match the color of the existing Courthouse and adjacent wall based on the approved sample panel. The color shall be uniform throughout the surfaces of the structure. Surface preparation and placement procedures shall be in accordance with manufacturer's recommendations. The finish of any area shall be completed in the same day, and the limits of a finished area shall be made at natural breaks in the surface. The surface shall be continuously moist cured for 48 hours commencing immediately after finishing operations in each area. The temperature of the air adjacent to the surface shall be not less than 50 degrees F for 24 hours prior to, and 48 hours after, the application. In hot, dry weather the smooth finish shall be applied in shaded areas or at night, and shall never be applied when there is significant hot, dry wind.

### 3.9 REPAIRS

### 3.9.1 Damp-Pack Mortar Repair

Form tie holes requiring repair and other defects whose depth is at least as great as their surface diameter but not over 4 inches shall be repaired by the damp-pack mortar method. Form tie holes shall be reamed and other similar defects shall be cut out to sound concrete. The void shall then be thoroughly cleaned, thoroughly wetted, brush-coated with a thin coat of neat cement grout and filled with mortar. Mortar shall be a stiff mix of 1 part portland cement to 2 parts fine aggregate passing the No. 16 mesh sieve, and minimum amount of water. Only sufficient water shall be used to produce a mortar which, when used, will stick together on being molded into a ball by a slight pressure of the hands and will not exude water but will leave the hands damp. Mortar shall be mixed and allowed to stand for 30 to 45 minutes before use with remixing performed immediately prior to use. Mortar shall be thoroughly tamped in place in thin layers using a hammer and hardwood block. Holes passing entirely through walls shall be completely filled from the inside face by forcing mortar through to the outside face. All holes shall be packed full. Damp-pack repairs shall be moist cured for at least 48 hours.

### 3.9.2 Repair of Major Defects

Major defects will be considered to be those more than 1/2 inch deep or, for Class A finishes, more than 1/2 inch in diameter and, for Class C and D finishes, more than 2 inches in diameter. Also included are any defects of any kind whose depth is over 4 inches or whose surface diameter is greater than their depth. Major defects shall be repaired as specified below.

#### 3.9.2.1 Surface Application of Mortar Repair

Defective concrete shall be removed, and removal shall extend into completely sound concrete. Approved equipment and procedures which will not cause cracking or microcracking of the sound concrete shall be used. If reinforcement is encountered, concrete shall be removed so as to expose the reinforcement for at least 2 inches on all sides. All such defective areas greater than 12 square inches shall be outlined by saw cuts at least 1 inch deep. Defective areas less than 12 square inches shall be outlined by a 1 inch deep cut with a core drill in lieu of sawing. All saw cuts shall be straight lines in a rectangular pattern in line with the formwork panels. After concrete removal, the surface shall be thoroughly cleaned by high pressure washing to remove all loose material. Surfaces shall be kept continually saturated for the first 12 of the 24 hours immediately before placing mortar and shall be damp but not wet at the time of commencing mortar placement. The Contractor, at his option, may use either hand-placed mortar or mortar placed with a mortar gun. If hand-placed mortar is used, the edges of the cut shall be perpendicular to the surface of the concrete. The prepared area shall be brush-coated with a thin coat of neat cement grout. The repair shall then be made using a stiff mortar, preshrunk by allowing the mixed mortar to stand for 30 to 45 minutes and then remixed, thoroughly tamped into place in thin layers. If hand-placed mortar is used, the Contractor shall test each repair area for drumminess by firm tapping with a hammer and shall inspect for cracks, both in the

presence of the Contracting Officer's representative, immediately before completion of the contract, and shall replace any showing drumminess or cracking. If mortar placed with a mortar gun is used, the gun shall be a small compressed air-operated gun to which the mortar is slowly hand fed and which applies the mortar to the surface as a high-pressure stream, as approved. Repairs made using shotcrete equipment will not be accepted. The mortar used shall be the same mortar as specified for damp-pack mortar repair. If gun-placed mortar is used, the edges of the cut shall be beveled toward the center at a slope of 1:1. All surface applied mortar repairs shall be continuously moist cured for at least 7 days. Moist curing shall consist of several layers of saturated burlap applied to the surface immediately after placement is complete and covered with polyethylene sheeting, all held closely in place by a sheet of plywood or similar material rigidly braced against it. Burlap shall be kept continually wet.

#### 3.9.2.2 Repair of Deep and Large Defects

Deep and large defects will be those that are more than 6 inches deep and also have an average diameter at the surface more than 18 inches or that are otherwise so identified by the Project Office. Such defects shall be repaired as specified herein or directed, except that defects which affect the strength of the structure shall not be repaired and that portion of the structure shall be completely removed and replaced. Deep and large defects shall be repaired by procedures approved in advance including forming and placing special concrete using applied pressure during hardening. Preparation of the repair area shall be as specified for surface application of mortar. In addition, the top edge (surface) of the repair area shall be sloped at approximately 20 degrees from the horizontal, upward toward the side from which concrete will be placed. The special concrete shall be a concrete mixture with low water content and low slump, and shall be allowed to age 30 to 60 minutes before use. Concrete containing a specified expanding admixture may be used in lieu of the above mixture; the paste portion of such concrete mixture shall be designed to have an expansion between 2.0 and 4.0 percent when tested in accordance with ASTM C 940. A full width "chimney" shall be provided at the top of the form on the placing side to ensure filling to the top of the opening. A pressure cap shall be used on the concrete in the chimney with simultaneous tightening and revibrating the form during hardening to ensure a tight fit for the repair. The form shall be removed after 24 hours and immediately the chimney shall be carefully chipped away to avoid breaking concrete out of the repair; the surface of the repair concrete shall be dressed as required.

#### 3.9.3 Resinous and Latex Material Repair

In lieu of the portland cement bonding coats specified above, an epoxy resin or a latex bonding agent may be used.

#### 3.10 FINISHING UNFORMED SURFACES

The finish of all unformed surfaces shall meet the requirements of paragraph Tolerances in PART 1, when tested as specified herein.

### 3.10.1 General

The ambient temperature of spaces adjacent to unformed surfaces being finished and of the base on which concrete will be placed shall be not less than 50 degrees F. In hot weather all requirements of paragraphs Hot Weather Requirements and Prevention of Plastic Shrinkage Cracking shall be met. Unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish, with additional finishing as specified below, and shall be true to the elevation shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings, properly consolidated, and left true and regular. Unless otherwise shown on the drawings, exterior surfaces shall be sloped for drainage, as directed. Where drains are provided, interior floors shall be evenly sloped to the drains. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or "jitterbugs" shall not be used for any surfaces. The dusting of surfaces with dry cement or other materials or the addition of any water during finishing shall not be permitted. If bleed water is present prior to finishing, the excess water shall be carefully dragged off or removed by absorption with porous materials such as burlap. During finishing operations, extreme care shall be taken to prevent over finishing or working water into the surface; this can cause "crazing" (surface shrinkage cracks which appear after hardening) of the surface. Any slabs with surfaces which exhibit significant crazing shall be removed and replaced. During finishing operations, surfaces shall be checked with a 10 foot straightedge, applied in both directions at regular intervals while the concrete is still plastic, to detect high or low areas.

### 3.10.2 Rough Slab Finish

As a first finishing operation for unformed surfaces and as final finish for slabs to receive mortar setting beds, the surface shall receive a rough slab finish prepared as follows. All below-grade slabs and foundations shall receive only a rough slab finish. The concrete shall be uniformly placed across the slab area, consolidated as previously specified, and then screeded with straightedge strikeoffs immediately after consolidation to bring the surface to the required finish level with no coarse aggregate visible. Side forms and screed rails shall be provided, rigidly supported, and set to exact line and grade. Allowable tolerances for finished surfaces apply only to the hardened concrete, not to forms or screed rails. Forms and screed rails shall be set true to line and grade. "Wet screeds" shall not be used.

### 3.10.3 Floated Finish

All slabs and foundations exposed to view shall next be given a wood float finish. The screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. Then, after the concrete has stiffened so that it will withstand a man's weight without imprint of more than 1/4 inch and the water sheen has disappeared, it shall be floated to a true and even plane free of ridges. Floating shall be performed by use of suitable hand floats or power driven equipment. Sufficient pressure shall be used on the floats

to bring a film of moisture to the surface. Hand floats shall be made of wood, magnesium, or aluminum. Care shall be taken to prevent over-finishing or incorporating water into the surface.

#### 3.10.4 Non-Slip Finish

Non-slip slabs shall be constructed in accordance with the following subparagraphs.

##### 3.10.4.1 Broomed (Courthouse Only)

All slabs and foundations exposed to view shall be given a broomed finish. After floating, the surface shall be lightly steel troweled, and then carefully scored by pulling a coarse fiber push-type broom across the surface. Brooming shall be transverse to traffic or at right angles to the slope of the slab. After the end of the curing period, the surface shall be vigorously broomed with a coarse fiber broom to remove all loose or semi-detached particles.

#### 3.11 RELATED ITEMS

##### 3.11.1 Sidewalks and Curbs and Gutters

Sidewalks and Curbs and Gutters shall conform to the requirements of Section 02770 CONCRETE SIDEWALKS AND CURBS AND GUTTERS

##### 3.11.2 Pits and Trenches

Pits and trenches shall be constructed as indicated on the drawings. Bottoms and walls shall be placed monolithically or waterstops and keys, shall be provided as approved.

#### 3.12 CURING AND PROTECTION

##### 3.12.1 General

Concrete shall be cured by an approved method for the period of time given below:

Concrete with Type III cement	3 days
All other concrete	7 days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and damage from rain and flowing water for the duration of the curing period. Air and forms in contact with concrete shall be maintained at a temperature above 50 degrees F for the first 3 days and at a temperature above 32 degrees F for the remainder of the specified curing period. Exhaust fumes from combustion heating units shall be vented to the outside of the enclosure, and heaters and ducts shall be placed and directed so as not to cause areas of overheating and drying of concrete surfaces or to create fire hazards. Materials and equipment needed for adequate curing and protection shall be available and at the site prior to placing concrete. No fire or excessive heat, including welding, shall be

permitted near or in direct contact with the concrete at any time. Except as otherwise permitted by paragraph Membrane Forming Curing Compounds, moist curing shall be provided for any areas to receive floor hardener, any paint or other applied coating, or to which other concrete is to be bonded.

Moist curing or moist and membrane curing shall be used for all pavements.

Except for plastic coated burlap, impervious sheeting alone shall not be used for curing.

### 3.12.2 Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period, commencing immediately after finishing. If water or curing materials used stain or discolor concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned as approved. When wooden forms are left in place during curing, they shall be kept wet at all times. If steel forms are used in hot weather, nonsupporting vertical forms shall be broken loose from the concrete soon after the concrete hardens and curing water continually applied in this void. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Surfaces shall be cured by ponding, by continuous sprinkling, by continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap. Burlap and mats shall be clean and free from any contamination and shall be completely saturated before being placed on the concrete. The Contractor shall have an approved work system to ensure that moist curing is continuous 24 hours per day.

### 3.12.3 Membrane Forming Curing Compounds

Membrane curing shall not be used on surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete, including surfaces to which a smooth finish is to be applied or other concrete to be bonded. However, a styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B requirements, may be used for surfaces which are to be painted or are to receive bituminous roofing or waterproofing, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, waterproofing or flooring specified. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam. Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. All surfaces shall be thoroughly moistened with water. Curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. Surfaces on which clear compound is used shall be shaded from

direct rays of the sun for the first 3 days. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

#### 3.12.4 Impervious Sheeting

Except for plastic coated burlap, impervious sheeting alone shall not be used for curing. Impervious-sheet curing shall only be used on horizontal or nearly horizontal surfaces. Surfaces shall be thoroughly wetted and be completely covered with the sheeting. Sheeting shall be at least 18 inches wider than the concrete surface to be covered. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted down or shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

#### 3.12.5 Ponding or Immersion

Concrete shall be continually immersed throughout the curing period. Water shall not be more than 20 degrees F less than the temperature of the concrete.

#### 3.12.6 Cold Weather Curing and Protection

When the daily ambient low temperature is less than 32 degrees F the temperature of the concrete shall be maintained above 40 degrees F for the first seven days after placing. During the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 25 degrees F as determined by suitable temperature measuring devices furnished by the Contractor, as required, and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor as directed.

### 3.13 TESTING AND INSPECTION FOR CONTRACTOR QUALITY CONTROL

The Contractor shall perform the inspection and tests described below and, based upon the results of these inspections and tests, shall take the action required and shall submit specified reports. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease and the operation shall be corrected. The laboratory performing the tests shall be on site and shall conform with ASTM C 1077. Materials may be subjected to check testing by the Government from samples obtained at the manufacturer, at transfer points, or at the project site. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and periodically thereafter for conformance with ASTM C 1077.

#### 3.13.1 Grading and Corrective Action

#### 3.13.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately reported to the Contracting Officer, concreting shall be stopped, and immediate steps taken to correct the grading.

#### 3.13.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control coarser than the specification limits for samples taken other than as delivered to the mixer to allow for degradation during handling. When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of 5 tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

#### 3.13.2 Quality of Aggregates

Thirty days prior to the start of concrete placement, the Contractor shall perform all tests for aggregate quality required by ASTM C 33. Tests shall not have been performed more than 6 months prior to submission. The mortar bar method of testing for alkali reaction shall be performed only if the chemical test method indicates the aggregates to be potentially deleterious. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality at least every three months, and when the source of aggregate or aggregate quality changes. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

#### 3.13.3 Scales, Batching and Recording

The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every three months. Such tests

shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors. Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. At the same time, the Contractor shall test and ensure that the devices for dispensing admixtures are operating properly and accurately. When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

#### 3.13.4 Batch-Plant Control

The measurement of concrete materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during each day's plant operation.

#### 3.13.5 Concrete Mixture

- a. Air Content Testing. One test for air content shall be performed per truckload of concrete or per batch of concrete mixed on site for each separate concrete mixture produced. Tests shall be made in accordance with ASTM C 231 for normal weight concrete. Test results shall be plotted on control charts which shall at all times be readily available to the Government and shall be submitted weekly. Copies of the current control charts shall be kept in the field by testing crews and results plotted as tests are made. When a single test result reaches either the upper or lower action limit, a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the air content of the batch to plot on both the air content and the control chart for range, and for determining need for any remedial action. The result of each test, or average as noted in the previous sentence, shall be plotted on a separate control chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph Air Entrainment. An upper warning limit and a lower warning limit line shall be set 1.0 percentage point above and below the average line, respectively. An upper action limit and a lower action limit line shall be set 1.5 percentage points above and below the average line, respectively. The range between each two consecutive tests shall be plotted on a secondary control chart for range where an upper warning limit is set at 2.0 percentage points and an upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the

Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the Contractor's materials or transportation methods cause air content loss between the mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer, and the air content at the mixer controlled as directed.

- b. Air Content Corrective Action. Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the secondary control chart for range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted.
- c. Slump Testing. One slump test shall be performed per truckload of concrete. Tests shall be performed in accordance with ASTM C 143. Test results shall be plotted on control charts which shall at all times be readily available to the Government and shall be submitted weekly. Copies of the current control charts shall be kept in the field by testing crews and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control charts for slump and the chart for range, and for determining need for any remedial action. Limits shall be set on separate control charts for slump for each type of mixture. The upper warning limit shall be set at 1/2 inch below the maximum allowable slump specified in paragraph Slump in PART 1 for each type of concrete and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 2 inches. Samples for slump shall be taken at the mixer. However, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between the mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer, and the slump at the mixer controlled as directed.
- d. Slump Corrective Action. Whenever points on the control charts for slump reach the upper warning limit, an adjustment shall immediately be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum w/c

ratio specified, based on aggregates which are in a saturated surface dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive individual slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted, and the Contractor shall take appropriate steps to bring the slump under control. Additional slump tests shall be made as directed.

- e. Temperature. The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064/C 1064M. The temperature shall be reported along with the compressive strength data.
- f. Strength Specimens. At least one set of test specimens shall be made, for compressive or flexural strength as appropriate, on each different concrete mixture placed during the day for each 50 cubic yards or portion thereof of that concrete mixture placed each day. Additional sets of test specimens shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A truly random (not haphazard) sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph Strength Requirements in PART 1 shall consist of four specimens, two to be tested at 7 days and two at 28 days. Test specimens shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39 for test cylinders and ASTM C 78 for test beams. Results of all strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength "tests", ("test" as defined in paragraph Strength Requirements in PART 1) moving average of last 3 "tests" for strength, and moving average for range for the last 3 "tests" for each mixture. The charts shall be similar to those found in ACI 214.3R.

#### 3.13.6 Inspection Before Placing

Foundations, construction joints, forms, and embedded items shall be inspected by the Contractor in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

#### 3.13.7 Placing

The placing foreman shall supervise placing operations, shall determine that the correct quality of concrete or grout is placed in each location as

specified and as directed by the Contracting Officer, and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, volume placed, and method of placement. The placing foreman shall not permit batching and placing to begin until it has been verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

#### 3.13.8 Vibrators

The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined while the vibrator is operating in concrete with the tachometer being held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head, and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing. Any vibrator not meeting the requirements of paragraph Consolidation, shall be immediately removed from service and repaired or replaced.

#### 3.13.9 Curing Inspection

- a. Moist Curing Inspections. At least once each shift, and not less than twice per day on both work and non-work days, an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.
- b. Moist Curing Corrective Action. When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for those areas shall be extended by 1 day.
- c. Membrane Curing Inspection. No curing compound shall be applied until the Contractor has verified that the compound is properly mixed and ready for spraying. At the end of each operation, the Contractor shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered, shall compute the rate of coverage in square feet per gallon, and shall note whether or not coverage is uniform.
- d. Membrane Curing Corrective Action. When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.
- e. Sheet Curing Inspection. At least once each shift and once per day on non-work days, an inspection shall be made of all areas

being cured using impervious sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

- f. Sheet Curing Corrective Action. When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by 1 day.

#### 3.13.10 Cold-Weather Protection

At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. Any deficiencies shall be noted, corrected, and reported.

#### 3.13.11 Mixer Uniformity

- a. Stationary Mixers. Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the shortest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94.
- b. Truck Mixers. Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete mixing shall be determined in accordance with ASTM C 94. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer, the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory.
- c. Mixer Uniformity Corrective Action. When a mixer fails to meet mixer uniformity requirements, either the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

#### 3.13.12 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all contractor quality control records.

-- End of Section --

## SECTION 05055A

METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS  
12/92

## 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.

## ALUMINUM ASSOCIATION (AA)

AA SAS-30 (1986) Aluminum Structures Construction Manual Series - Section 1 Specifications for Aluminum Structures

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123 (1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 514/A 514M (1994a) High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding

ASTM A 780 (1993a) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM D 962 (1981; R 1994) Aluminum Powder and Paste Pigments for Paints

ASTM E 165 (1995) Liquid Penetrant Examination Inspection Method

ASTM E 709 (1995) Magnetic Particle Examination

## ASME INTERNATIONAL (ASME)

ASME BPVC SEC IX (1995) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

## AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 (2002) Structural Welding Code - Steel

AWS D1.2 (1997) Structural Welding Code - Aluminum

## SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS 3110 (1992; Rev G) Primer Zinc Chromate  
SAE AMS 3132 (1994; Rev F) Varnish, Phenolic Resin  
Corrosion-Preventive

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

Detail Drawings; G|ED

Detail drawings for metalwork and machine work shall be submitted and approved prior to fabrication.

### SD-03 Product Data

Welding of Structural Steel; G|ED

Schedules of welding procedures for steel structures shall be submitted and approved prior to commencing fabrication.

Welding of Aluminum; G|ED

Schedules of welding processes for aluminum fabrications shall be submitted and approved prior to commencing fabrication.

Structural Steel Welding Repairs; G|ED

Welding repair plans for steel shall be submitted and approved prior to making repairs.

Materials Orders

Copies of purchase orders, mill orders, shop orders and work orders for materials shall be submitted prior to the use of the materials in the work.

Materials List; G|ED

Materials list for fabricated items shall be submitted at the time of submittal of detail drawings.

Shipping Bill

Shipping bill shall be submitted with the delivery of finished pieces to the site.

## SD-06 Test Reports

## Tests, Inspections, and Verifications

Certified test reports for materials shall be submitted with all materials delivered to the site.

## SD-07 Certificates

## Qualification of Welders and Welding Operators

Certifications for welders and welding operators shall be submitted prior to commencing fabrication.

## Application Qualification for Steel Studs

Certified reports for the application qualification for steel studs shall be submitted and approved prior to commencing fabrication.

## Welding of Aluminum

Certified report for aluminum welding qualification tests shall be submitted and approved prior to commencing welding.

## 1.3 DETAIL DRAWINGS

Detail drawings for metalwork and machine work shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of material as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the detail drawings.

## 1.4 QUALIFICATION OF WELDERS AND WELDING OPERATORS

The Contractor shall certify that the qualification of welders and welding operators and tack welders who will perform structural steel welding have been qualified for the particular type of work to be done in accordance with the requirements of AWS D1.1, Section 5, prior to commencing fabrication. The certificate shall list the qualified welders by name and shall specify the code and procedures under which qualified and the date of qualification. Prior qualification will be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require welders to repeat the qualifying tests when their work indicates a reasonable doubt as to proficiency. Those passing the requalification tests will be recertified. Those not passing will be disqualified until passing. All expenses in connection with qualification and requalification shall be borne by the Contractor.

## PART 2 PRODUCTS

## 2.1 MATERIALS

### 2.1.1 Materials Orders

The Contractor shall furnish 5 copies of purchase orders, mill orders, shop orders and work orders for all materials orders and items used in the work.

Where mill tests are required purchase orders shall contain the test site address and the name of the testing agency.

### 2.1.2 Materials List

The Contractor shall furnish a materials list of the materials to be used in the fabrication of each item.

### 2.1.3 Shipping Bill

The Contractor shall furnish a shipping bill or memorandum of each shipment of finished pieces or members to the project site giving the designation mark and weight of each item, the number of items, the total weight, and the car initial and number if shipped by rail in carload lots. Duplicate copies of shipping bills shall be mailed promptly to the Contracting Officer.

## 2.2 FABRICATION

### 2.2.1 Structural Fabrication

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Bends shall be made by approved dies, press brakes or bending rolls. Where heating is required, precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner that will not impair the original properties of the metal. Proposed flame cutting of material other than structural steel shall be subject to approval and shall be indicated on detail drawings. Shearing shall be accurate and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown. Re-entrant cuts shall be filleted to a minimum radius of 3/4 inch unless otherwise approved. Finished members shall be free of twists, bends and open joints. Bolts, nuts and screws shall be tight.

#### 2.2.1.1 Dimensional Tolerances for Structural Work

Dimensions shall be measured by an approved calibrated steel tape of approximately the same temperature as the material being measured. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the particular section of these specifications for the item of work. Where tolerances are not specified in other sections of these specifications or shown, an allowable variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends shall not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by more than 1/8 inch for members over 30 feet in length.

#### 2.2.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1, Subsection 3.2. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Hand-guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

#### 2.2.1.3 Structural Aluminum Fabrication

Laying out and cutting of aluminum shall be in accordance with the AA SAS-30, Section 6.

#### 2.2.2 Welding

##### 2.2.2.1 Welding of Structural Steel

a. Welding Procedures for Structural Steel - Welding procedures for structural steel shall be prequalified as described in AWS D1.1, Subsection 5.1 or shall be qualified by tests as prescribed in AWS D1.1, Section 5. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish a welding procedure as prequalified. For welding procedures qualified by tests, the test welding and specimen testing must be witnessed and the test report document signed by the Contracting Officer. Approval of any welding procedure will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contractor Officer. The Contractor shall submit a complete schedule of welding procedures for each steel structure to be welded. The schedule shall conform to the requirements specified in the provisions AWS D1.1, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10. The schedule shall provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint. Welding procedures must include filler metal, preheat, interpass temperature and stress-relief heat treatment requirements. Each welding procedure shall be clearly identified as being prequalified or required to be qualified by tests. Welding procedures must show types and locations of welds designated or in the specifications to receive nondestructive examination.

b. Welding Process - Welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal and shall conform to the applicable provisions of AWS D1.1, Sections 1 thru 7, 9, 10 and 11. Welding shall be such as to minimize residual stresses, distortion and shrinkage.

c. Welding Technique

(1) Filler Metal - The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used or shall be as shown where a specific choice of AWS specification allowables is required. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. A controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1, Subsection 4.5 to maintain low moisture of low hydrogen electrodes.

(2) Preheat and Interpass Temperature - Preheating shall be performed as required by AWS D1.1, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

(3) Stress-Relief Heat Treatment - Where stress relief heat treatment is specified or shown, it shall be in accordance with the requirements of AWS D1.1, Subsection 4.4 unless otherwise authorized or directed.

d. Workmanship - Workmanship for welding shall be in accordance with AWS D1.1, Section 3 and other applicable requirements of these specifications.

(1) Preparation of Base Metal - Prior to welding the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1, Subsection 3.2.

(2) Temporary Welds - Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed for permanent work. Temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified in these specifications. Preheating for temporary welds shall be as required by AWS D1.1 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds arcs shall not be struck in other than weld locations. Each temporary weld shall be removed and ground flush with adjacent surfaces after serving its purpose.

(3) Tack Welds - Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds and shall be cleaned and thoroughly fused with permanent welds. Preheating shall be performed as specified above for temporary welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

#### 2.2.2.2 Welding of Aluminum

Welding of aluminum shall conform to AA SAS-30 or AWS D1.2, Sections 1 through 7, 9 and 10. The welding process and welding operators shall be prequalified as required by AWS D1.2, Section 5 or AA SAS-30, Subsection 7.2.4 in accordance with the methods described in ASME BPVC SEC IX, Section IX. A certified report giving the results of the qualifying tests shall be furnished for approval. A complete schedule of the welding process for each aluminum fabrication to be welded shall be furnished for approval.

#### 2.2.2.3 Welding of Steel Studs

The procedures for welding steel studs to structural steel, including mechanical, workmanship, technique, stud application qualification, production quality control and fabrication and verification inspection procedures shall conform to the requirements of AWS D1.1, Section 7, except as otherwise specified.

a. Application Qualification for Steel Studs - As a condition of approval of the stud application process, the Contractor shall furnish certified test reports and certification that the studs conform to the requirements of AWS D1.1, Subsections 7.2 and 7.3, certified results of the stud manufacturer's stud base qualification test, and certified results of the stud application qualification test as required by AWS D1.1, Subsection 7.6, except as otherwise specified.

b. Production Quality Control - Quality control for production welding of studs shall conform to the requirements of AWS D1.1, Subsection 7.7, except as otherwise specified. Studs on which pre-production testing is to be performed shall be welded in the same general position as required on production studs (flat, vertical, overhead or sloping). If the reduction of the length of studs becomes less than normal as they are welded, welding shall be stopped immediately and not resumed until the cause has been corrected.

#### 2.2.3 Miscellaneous Provisions

##### 2.2.3.1 Metallic Coatings

a. Zinc Coatings - Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. Where zinc coatings are destroyed by cutting, welding or other causes the affected areas shall be regalvanized. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be repaired in accordance with ASTM A 780.

#### 2.2.4 Shop Assembly

Each structural unit furnished shall be assembled in the shop to determine the correctness of the fabrication and matching of the component parts unless otherwise specified. Tolerances shall not exceed those shown. Each unit assembled shall be closely checked to ensure that all necessary

clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be in the same position as final installation in the field unless otherwise specified. Assembly and disassembly work shall be performed in the presence of the Contracting Officer unless waived in writing. Errors or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Before disassembly for shipment each piece of a machinery or structural unit shall be match-marked to facilitate erection in the field. The location of match-marks shall be indicated by circling with a ring of white paint after the shop coat of paint has been applied or as otherwise directed.

### 2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

The Contractor shall have required material tests and analyses performed and certified by an approved laboratory to demonstrate that materials are in conformity with the specifications. These tests and analyses shall be performed and certified at the Contractor's expense. Tests, inspections, and verifications shall conform to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Tests shall be conducted in the presence of the Contracting Officer if so required. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

#### 2.3.1 Nondestructive Testing

When doubt exists as to the soundness of any material part such part may be subjected to any form of nondestructive testing in addition to contract required testing as determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts shall be replaced and retested at the Contractor's expense.

#### 2.3.2 Tests of Structural Units

The details for tests of structural units shall conform to the requirements of the particular sections of these specifications covering these items. Each complete structural unit shall be assembled and tested in the shop in the presence of the Contracting Officer unless otherwise directed. Waiving of tests will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site each complete machinery or structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects.

#### 2.3.3 Inspection of Structural Steel Welding

The Contractor shall maintain an approved inspection system and perform

required inspections in accordance with SECTION: 01451, CONTRACTOR QUALITY CONTROL. Welding shall be subject to inspection to determine conformance with the requirements of AWS D1.1, the approved welding procedures and provisions stated in other sections of these specifications.

Nondestructive examination of designated welds will be required.

Supplemental examination of any joint or coupon cut from any location in any joint may be required.

#### 2.3.3.1 Visual Examination

All visual examination of completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.1, Section 3 and Section 9, Part D.

#### 2.3.3.2 Nondestructive Examination

The nondestructive examination of shop and field welds shall be performed as designated or described in the sections of these specifications covering the particular items of work.

a. Testing Agency - The nondestructive examination of welds and the evaluation of examination tests as to the acceptability of the welds shall be performed by a testing agency adequately equipped and competent to perform such services or by the Contractor using suitable equipment and qualified personnel. In either case written approval of the examination procedures is required and the examination tests shall be made in the presence of the Contracting Officer. The evaluation of examination tests shall be subject to the approval and all records shall become the property of the Government.

b. Examination Procedures - Examination procedures shall conform to the following requirements.

(1) Ultrasonic Testing - Making, evaluating and reporting ultrasonic testing of welds shall conform to the requirements of AWS D1.1, Section 6, Part C. The ultrasonic equipment shall be capable of making a permanent record of the test indications. A record shall be made of each weld tested.

(2) Radiographic Testing - Making, evaluating and reporting radiographic testing of welds shall conform to the requirements of AWS D1.1, Section 6, Part B.

(3) Magnetic Particle Inspection - Magnetic particle inspection of welds shall conform to the applicable provisions of ASTM E 709.

(4) Dye Penetrant Inspection - Dye penetrant inspection of welds shall conform to the applicable provisions of ASTM E 165.

c. Acceptability of Welds - Welds shall be unacceptable if shown to have defects prohibited by AWS D1.1, Subsection 9.25 or possess any degree of incomplete fusion, inadequate penetration or undercutting.

d. Welds to be Subject to Nondestructive Examination

All welds shall be visually inspected. Welds requiring nondestructive testing shall be as indicated on the drawings.

2.3.3.3 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Should tests of any two coupons cut from the work of any welder show strengths less than that specified for the base metal it will be considered evidence of negligence or incompetence and such welder shall be removed from the work. When coupons are removed from any part of a structure the members cut shall be repaired in a neat manner with joints of the proper type to develop the full strength of the members. Repaired joints shall be peened as approved or directed to relieve residual stress. The expense for removing and testing coupons, repairing cut members and the nondestructive examination of repairs shall be borne by the Contractor if found to be in noncompliance with the specifications.

2.3.4 Structural Steel Welding Repairs

Defective welds in the structural steel welding repairs shall be repaired in accordance with AWS D1.1, Subsection 3.7. Defective weld metal shall be removed to sound metal by use of air carbon-arc or oxygen gouging. Oxygen gouging shall not be used on ASTM A 514/A 514M steel. The surfaces shall be thoroughly cleaned before welding. Welds that have been repaired shall be retested by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds costs of repairs and retesting shall be borne by the Contractor.

2.3.5 Inspection and Testing of Steel Stud Welding

Fabrication and verification inspection and testing of steel stud welding shall conform to the requirements of AWS D1.1, Subsection 7.8 except as otherwise specified. The Contracting Officer will serve as the verification inspector. One stud in every 100 and studs that do not show a full 360 degree weld flash, have been repaired by welding or whose reduction in length due to welding is less than normal shall be bent or torque tested as required by AWS D1.1, Subsection 7.8. If any of these studs fail two additional studs shall be bent or torque tested. If either of the two additional studs fail all of the studs represented by the tests shall be rejected. Studs that crack under testing in either the weld, base metal or shank shall be rejected and replaced by the Contractor at no additional cost.

PART 3 EXECUTION

3.1 PROTECTION OF FINISHED WORK

3.1.1 Aluminum

Aluminum that shall be in contact with grout or concrete shall be protected from galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. Aluminum in contact with structural steel shall be protected against galvanic or corrosive action by being given a coat of zinc-chromate primer and a coat of aluminum paint. The zinc-chromate primer shall conform to SAE AMS 3110. The aluminum paint shall consist of a aluminum paste conforming to ASTM D 962, spar varnish conforming to SAE AMS 3132 and thinner compatible with the varnish. The aluminum paint shall be field mixed in proportion of 2 pounds of paste, not more than one gallon of spar varnish and not more than one pint of thinner.

### 3.2 TESTS

#### 3.2.1 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

-- End of Section --

## SECTION 05502A

METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS  
05/92

## 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 307	(1994) Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
ASTM A 325	(1996) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 588/A 588M	(1994) High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick
ASTM B 209	(1996) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 241/B 241M	(1996) Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube
ASTM B 308/B 308M	(1996) Aluminum-Alloy 6061-T6 Standard Structural Shapes

## ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1981; Supple 1991; R 1992) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1993) Square and Hex Nuts (Inch Series)
ASME B18.3	(1986; R 1995) Socket Cap, Shoulder and Set Screws (Inch Series) Including Dimensions of Hexagon and Spline Sockets and Keys to Match
ASME B18.6.2	(1972; R 1993) Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws

ASME B18.6.3 (1972; R 1991) Machine Screws and Machine  
Screw Nuts

ASME B18.21.1 (1994) Lock Washers (Inch Series)

ASME B18.22.1 (1965; R 1990) Plain Washers

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

Shop Fabricated Metal Items; G|ED

Detail drawings shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

### SD-03 Product Data

Miscellaneous Metals and Standard Metal Articles; G|AR  
Shop Fabricated Metal Items; G|AR

Lists of materials shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

Records which identify the disposition of approved material and fabricated items in the work must be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

### SD-06 Test Reports

Miscellaneous Metals and Standard Metal Articles; G|ED  
Shop Fabricated Metal Items; G|ED

Certified test reports for materials tests and analyses shall be submitted for approval as specified and in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

## 1.3 FABRICATION AND WORKMANSHIP REQUIREMENTS

Fabrication requirements and workmanship provisions for items specified in this section shall conform with the requirements of Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

## PART 2 PRODUCTS

## 2.1 MISCELLANEOUS METALS AND STANDARD METAL ARTICLES

Miscellaneous metal materials and standard metal articles shall conform to the respective specifications and other designated requirements. Sizes shall be as specified or shown. Where material requirements are not specified, materials furnished shall be suitable for the intended use and shall be subject to approval.

### 2.1.1 Structural Steel

ASTM A 588/A 588M, Grade 50, unless noted otherwise on drawings.

### 2.1.2 Aluminum

#### 2.1.2.1 Sheets and Plates

ASTM B 209, Alloy 6063, Temper T6.

#### 2.1.2.2 Structural Shapes

ASTM B 308/B 308M, Alloy 6061, Temper T6.

#### 2.1.2.3 Pipe

ASTM B 241/B 241M, Alloy 6063, Temper T6 nominal outside diameter as shown.

### 2.1.3 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall be of the material, grade, type, class, style and finish indicated or best suited for intended use.

#### 2.1.3.1 High-Strength Bolts, Nuts, and Washers

ASTM A 325, Type N, hot-dip galvanized.

#### 2.1.3.2 Bolts, Nuts, and Washers (Other Than High-Strength)

a. Bolts and Nuts - ASTM A 307, Grade A, hot-dip galvanized.

b. Bolts - ASME B18.2.1.

c. Nuts - ASME B18.2.2.

d. Washers

(1) Plain Washers - ASME B18.22.1, Type B.

(2) Lock Washer - ASME B18.21.1.

#### 2.1.3.3 Stainless Steel Bolts

Stainless steel bolts shall be type 316

#### 2.1.4 Screws

Screws shall be of the material, grade, type, style, and finish indicated or best suited for use intended.

##### 2.1.4.1 Cap Screws

ASME B18.2.1, ASME B18.3, or ASME B18.6.2 as required.

##### 2.1.4.2 Machine Screws

ASME B18.6.3.

##### 2.1.4.3 Set Screws

ASME B18.6.2.

#### 2.2 SHOP FABRICATED METAL ITEMS

Shop fabricated metal items shall conform to the requirements and details as specified or shown and to the workmanship provisions and other applicable fabrication requirements as specified in Section 05055 METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

##### 2.2.1 Railings

Railings shall be of the type specified and shown and shall be furnished and installed complete with all fittings, brackets, fasteners, sleeves, anchors, and other appurtenances as shown and as required for proper installation.

###### 2.2.1.1 Materials

Railings shall be of aluminum as specified in paragraph PIPE. Sleeves and other appurtenances shall be of the same material as the rails and posts or approved compatible materials, except that the anchor bolts shall be 316 stainless steel.

###### 2.2.1.2 Fabrication

Rigid joints in railings shall be of welded, threaded, or slip-on fittings assembly and shall be flush-finished. Welded joints shall be reinforced with tight-fitting interior sleeves and shall be assembled by welding rails and posts to flush-type fittings, or by mitering and welding joining rails and posts. Assembled threaded joints shall have no exposed threads. Slip-on fittings shall be tight-fitting. Fasteners for slip-on fittings shall be the self-locking, concealed type. Fasteners for steel fittings shall be of stainless steel. Expansion joints in railings shall be an inner-sleeved slip-joint, with one end of the sleeve secured to one rail and the ends of the adjoining rails separated a minimum of 1 inch in the installed position. Expansion joints shall be located in rails near the intersection of rails and posts. Bends in railings shall be made in a manner that railings are not crushed and shall maintain their original cross-sectional shape. Welds shall be ground smooth. Railings shall be

free of burrs, sharp corners, and sharp edges. For railings of other than welded assembly, manufacturer design calculations, showing that the installed railings are capable of withstanding a design working load of 200 pounds applied in any direction at any point on the top rail without permanent deformation, must be submitted and approved prior to installation.

#### 2.2.1.3 Installation

Railings shall be installed as specified and shown. Railing posts anchored to concrete surfaces perpendicular to the posts shall be rigidly secured to flange fittings anchored to concrete with expansion anchors. Railing posts anchored to concrete surfaces parallel to the posts shall be rigidly secured to flange fittings anchored to concrete with expansion anchors. Ends of rails anchored to concrete or masonry shall be rigidly secured to flange fittings anchored to concrete or masonry with expansion anchors

#### 2.2.2 Cover Plate Frame and Cover Plate

Post Recess frame and cover plates shall be of the material and size shown or specified herein. Frame and cover plate shall be galvanized after fabrication in accordance with ASTM A 123 with minimum coating thickness of 5 mils or 2.9 oz. per square foot..

##### 2.2.2.1 Cover Plates

Cover plates shall be in accordance with ASTM A 588 steel plate with an incorporated anti-slip martensitic steel surface consisting of a coarse random hatch matrix with a surface hardness of at least 55 on the Rockwell "C" scale and a band strength to the plate of at least 4,000 psi. The anti slip surface shall have a minimum coefficient of friction of 0.6 and be listed as slip resistant by Underwriters Laboratories. Sharp edges and burrs shall be removed from plates. Plate shall be galvanized after fabrication.

##### 2.2.2.2 Cover Plate Frames

Cover plate frames shall be fabricated of structural shapes of the type shown. Welded joints in frames shall be ground smooth. Frames shall be galvanized after fabrication.

### PART 3 EXECUTION (Not Applicable)

-- End of Section --

## SECTION 13123

STOPLOG STORAGE BUILDING  
03/03

## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-02 Design Drawings

Drawings; G,ED

A complete set of design drawings shall be provided showing plans, elevations, sections and details for all structural, architectural and electrical components. Each component shall be descriptively labeled to indicate material, size, attachment, etc. Accompanying the drawings shall be complete specifications for all construction materials and techniques, referencing applicable codes and standards and providing criteria, tolerances and properties. All drawings shall be sealed by a professional engineer or architect registered in the State of Pennsylvania.

## SD-03 Product Data

Split-Faced Block; G,ED

Manufacturer's data and color selection chart shall be submitted for approval and color selection.

Precast, Prestressed Concrete Roof Plank; G,ED

Precast, prestressed concrete plank manufacturer's data including load tables and recommended details for connection to masonry walls.

Architectural Features; G,ED

Provide materials list and catalog cuts for architectural features including, but not limited to, doors, louvers, flashing, sealant, roof insulation, roof membrane, gutter, downspout and splashblock.

Miscellaneous Items; G,ED

Provide catalog cuts for portable floodlights and panel truck

## SD-04 Samples

## Split-Faced Block; G,ED

Up to three different split-faced block units shall be submitted for Government selection of style and color.

## 1.2 DESIGN

Design shall provide for a stoplog storage building that has minimum interior plan dimensions of 12' x 30' and a minimum floor to ceiling height of 9'. Stoplog storage building shall be designed in accordance with all local building code requirements, except that the minimum design and material criteria specified herein shall be met when these requirements exceed building code requirements.

## PART 2 MINIMUM DESIGN CRITERIA

## 2.1 Excavation and Backfill

Excavation for the stoplog storage building shall be performed in accordance with the requirements as specified in Section 02329 of the specifications. Materials and methods for backfilling adjacent to the stoplog storage building shall be in accordance with the requirements as specified in Section 02316a of the specifications. Backfill materials shall consist of "Satisfactory Materials" as specified in Section 02316a and shall be placed and compacted to the requirements as specified in Section 02316a. As stated in paragraph 2.3, the concrete slab shall be placed on a 6-inch water capillary barrier. This water capillary barrier shall consist of "Coarse Drainage Fill" as specified in Section 02331 and shall be placed and compacted to the requirements as specified in Section 02331.

## 2.2 Wall Footings

Wall footings shall be concrete, 3,000 psi minimum compressive strength, at least 2'-0" wide and reinforced with at least 2-#5 bars continuous. Bottom of footing shall be located a minimum of 4'-6" below finished grade adjacent to wall. Provide #5 vertical rebar dowels extending from footing into wall at locations matching wall reinforcing. Provide appropriate lap splices and anchorage.

## 2.3 Slab on Grade

Slab on grade shall be concrete, 3,000 psi minimum compressive strength, at least 6" thick and reinforced with at least 6x6 W4.0xW4.0 wire mesh. Slab shall be placed on 6" capillary water barrier and 6 mil vapor barrier. Slab shall be isolated from walls by felt or other suitable material. Control joints shall be provided such that no slab section has an aspect ratio of more than 1.5 to 1.

## 2.4 Split-Faced Block

Split-Faced Block shall conform to ASTM C 90, Type I or II, made with normal weight aggregate. Block thickness shall be at least 8". Block shall be integrally colored. Submit color chart for approval and selection. Mortar shall be Type S, conforming to ASTM C270, except that Type S cement-lime mortar proportions shall be 1 part cement, ½ part lime and 4 ½ parts aggregate. Cement shall have a low alkali content and be of one brand. Mortar shall be colored similar to split-faced block. All cells shall be grouted from top of footing to top of walls. Grout shall conform to ASTM C476. Cement used in grout shall have a low alkali content. A continuous bond beam course shall be provided along the top of walls and shall be reinforced with at least a #5 bar. A reinforced masonry or precast concrete lintel shall be provided above doors. Vertical reinforcing shall be at least #5 bars at no greater than 32 inches on-center, with additional bars at wall corners and at doors. Horizontal reinforcing shall be #6 type, spaced 16" on-center vertically, conforming to ASTM A82, with zinc coating conforming to ASTM A153. Provide a vertical masonry control joint in each long wall.

## 2.5 Roof System

Roof system shall consist of at least 6" thick, precast, prestressed concrete planks with at least 1" of appropriate insulation covered by elastomeric (EPDM) membrane conforming to ASTM D4637, Type 1, 0.060 inch minimum thickness. Concrete planks shall be capable of safely supporting a total superimposed load of 100 psf or more, based on the actual span. Roof planks shall extend 1'-0" past outside face of walls and shall be provided with appropriate flashing and drip edges to prevent water from flowing from roof to walls. EPDM membrane shall be fully adhered or mechanically fastened to resist design wind uplift and shall be watertight. Manufacturer's standard warranty for the roofing system shall be provided for not less than 10 years from acceptance of work. Roof system shall be sloped across the short dimension of the building, with slope equivalent to one course of block. Vertical edge of roof planks around perimeter of building shall be concealed from view by use flashing.

## 2.6 Doors

Double doors shall be provided at each end of the building (long direction) centered in the wall. Doors shall be extra heavy duty type, conforming to ANSI A250.8, Level 3, Physical Performance Level A, intended for exterior use within CMU walls, provide an opening of at least 72"x84", have locking door knobs and dead-bolts and be shop painted by the manufacturer. Submit color chart for approval and selection. All locks shall be keyed alike.

## 2.7 Louvers

Louvers shall be provided in the split-faced CMU located within the two long sides of the building. Louvers shall be anodized aluminum and be specifically intended for use in masonry wall. At least 3 square feet of total louver area shall be provided, ½ in each long wall. Locate louvers below bond beam at roof.

## 2.8 Flashing

Flashing shall be provided as required to prevent water intrusion. Flashing shall be anodized aluminum, given one coat of zinc-molybdate primer and at least one coat of compatible exterior paint. Submit color chart for approval and selection.

## 2.9 Power and Lighting

Contractor shall provide 3 standard light fixtures equally spaced on ceiling and controlled by a single switch mounted on wall near doors at each end of building. Contractor shall also provide, at each end of the building, a GFCI duplex wall outlet. All conduits, switches, light fixtures, outlets and panel boxes shall be surface mounted and suitable for intended use. Electric service shall be provided from a panel box within existing Solomon Creek Pumping Station. Contractor shall verify appropriate location for new panel box with separate breaker and provide surface mounted conduit as required to south wall of pump station. Conduit shall be run through wall and down into ground. Conduit shall extend underground to storage building as shown on plan.

## 2.10 Miscellaneous Items

Contractor shall provide the following items along with the storage building:

Two roll-about portable floodlights, each having two 500 watt halogen lights.

Two 100 foot 18/3 extension cords.

One heavy duty panel truck with 3,000 pound minimum load capacity, removable uprights and at least 8" by 2" polyurethane wheels.

Submit catalog cuts for flood lights and panel truck for approval.

Two 12 foot Heavy Duty Aluminum Step Ladders with a minimum of 300 pound load capacity.

## PART 3 EXECUTION

### 3.1 General

The Stoplog Storage Building shall be erected in accordance with the detail drawings, as submitted, to ensure that the finished product conforms accurately to the approved dimensions, lines, elevations, and finishes.

-- End of Section --

## SECTION 15080A

THERMAL INSULATION FOR MECHANICAL SYSTEMS  
03/02

## 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. At the discretion of the Government, the manufacturer of any material supplied will be required to furnish test reports pertaining to any of the tests necessary to assure compliance with the standard or standards referenced in this specification.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 580/A 580M	(1998) Stainless Steel Wire
ASTM B 209	(2000) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM C 1136	(1995) Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM C 195	(1995) Mineral Fiber Thermal Insulating Cement
ASTM C 449/C 449M	(1995) Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement
ASTM C 533	(1995) Calcium Silicate Block and Pipe Thermal Insulation
ASTM C 795	(1992; R 1998e1) Thermal Insulation for Use in Contact with Austenitic Stainless Steel
ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials

## MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-69	(1996) Pipe Hangers and Supports - Selection and Application
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## MIDWEST INSULATION CONTRACTORS ASSOCIATION (MICA)

MICA Insulation Stds (1993) National Commercial & Industrial  
Insulation Standards

## 1.2 SYSTEM DESCRIPTION

Field-applied insulation and accessories on mechanical systems shall be as specified herein; factory-applied insulation is specified under the piping, duct or equipment to be insulated. Insulation of heat distribution systems and chilled water systems outside of buildings shall be as specified in Section 02552A PRE-ENGINEERED UNDERGROUND HEAT DISTRIBUTION SYSTEM, Section 02553A HEAT DISTRIBUTION SYSTEMS IN CONCRETE TRENCHES, Section 02554A ABOVEGROUND HEAT DISTRIBUTION SYSTEM, and Section 02555A PREFABRICATED UNDERGROUND HEATING/COOLING DISTRIBUTION SYSTEM. Field applied insulation materials required for use on Government-furnished items as listed in the SPECIAL CONTRACT REQUIREMENTS shall be furnished and installed by the Contractor.

## 1.3 GENERAL QUALITY CONTROL

### 1.3.1 Standard Products

Materials shall be the standard products of manufacturers regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

### 1.3.2 Installer's Qualifications

Qualified installers shall have successfully completed three or more similar type jobs within the last 5 years.

### 1.3.3 Surface Burning Characteristics

Unless otherwise specified, insulation not covered with a jacket shall have a flame spread index no higher than 75 and a smoke developed index no higher than 150. Insulation systems which are located in air plenums, in ceiling spaces, and in attic spaces shall have a flame spread index no higher than 25 and a smoke developed index no higher than 50. Insulation materials located exterior to the building perimeter are not required to be fire-rated. Flame spread, and smoke developed indexes, shall be determined by ASTM E 84. Insulation shall be tested in the same density and installed thickness as the material to be used in the actual construction. Material supplied by a manufacturer with a jacket shall be tested as a composite material. Jackets, facings, and adhesives shall have a flame spread index no higher than 25 and a smoke developed index no higher than 50 when tested in accordance with ASTM E 84.

### 1.3.4 Identification of Materials

Packages or standard containers of insulation, jacket material, cements, adhesives, and coatings delivered for use, and samples required for approval shall have manufacturer's stamp or label attached giving the name of the manufacturer and brand, and a description of the material.

#### 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

##### SD-04 Samples

###### Thermal Insulation Materials; G|ED.

A complete list of materials, including manufacturer's descriptive technical literature, performance data, catalog cuts, and installation instructions. The product number, k-value, thickness and furnished accessories for each mechanical system requiring insulation shall be included. Materials furnished under this section of the specification shall be submitted at one time.

After approval of materials and prior to applying insulation a booklet shall be prepared and submitted for approval. The booklet shall contain marked-up MICA Insulation Stds plates (or detail drawings showing the insulation material and insulating system) for each pipe, duct, or piece of equipment that must be insulated per this specification. The MICA plates shall be marked up showing the materials to be installed in accordance with the requirements of this specification for the specific insulation application. The Contractor shall submit all MICA Plates required to show the entire insulating system, including Plates required to show insulation penetrations, vessel bottom and top heads, legs, and skirt insulation as applicable. If the Contractor elects to submit detailed drawings instead of marked-up MICA Plates, the detail drawings shall show cut-away, section views, and details indicating each component of the insulation system and showing provisions for insulating jacketing, and sealing portions of the equipment. For each type of insulation installation on the drawings, provide a label that identifies each component in the installation (i.e., the duct, insulation, adhesive, vapor retarder, jacketing, tape, mechanical fasteners, etc.) Indicate insulation by type and manufacturer. Three copies of the booklet shall be submitted at the jobsite to the Contracting Officer. One copy of the approved booklet shall remain with the insulation Contractor's display sample and two copies shall be provided for Government use.

After approval of materials actual sections of installed systems properly insulated in accordance with the specification requirements shall be displayed. Such actual sections must remain accessible to inspection throughout the job and will be reviewed from time to time for controlling the quality of the work throughout the construction site. Each material used shall be identified, by indicating on an attached sheet the specification requirement for the material and the material by each manufacturer

intended to meet the requirement. The Contracting Officer will inspect display sample sections at the jobsite. Approved display sample sections shall remain on display at the jobsite during the construction period. Upon completion of construction, the display sample sections will be closed and sealed.

Pipe Insulation Display Sections: Display sample sections shall include as a minimum an elbow or tee, a valve, dielectric waterways and flanges, a hanger with protection shield and insulation insert, or dowel as required, at support point, method of fastening and sealing insulation at longitudinal lap, circumferential lap, butt joints at fittings and on pipe runs, and terminating points for each type of pipe insulation used on the job, and for hot pipelines and cold pipelines, both interior and exterior, even when the same type of insulation is used for these services.

#### 1.5 STORAGE

Materials shall be delivered in the manufacturer's unopened containers. Materials delivered and placed in storage shall be provided with protection from weather, humidity, dirt, dust and other contaminants. The Contracting Officer may reject insulation material and supplies that become dirty, dusty, wet, or contaminated by some other means.

### PART 2 PRODUCTS

#### 2.1 GENERAL MATERIALS

Materials shall be compatible and shall not contribute to corrosion, soften, or otherwise attack surfaces to which applied in either the wet or dry state. Materials to be used on stainless steel surfaces shall meet ASTM C 795 requirements. Materials shall be asbestos free and conform to the following:

##### 2.1.1 Adhesives

###### 2.1.1.1 Mineral Fiber Insulation Cement

Cement shall be in accordance with ASTM C 195.

##### 2.1.2 Caulking

ASTM C 920, Type S, Grade NS, Class 25, Use A.

##### 2.1.3 Finishing Cement

ASTM C 449/C 449M: Mineral fiber hydraulic-setting thermal insulating and finishing cement. All cements that may come in contact with Austenitic stainless steel must include testing per ASTM C 795.

##### 2.1.4 Jackets

#### 2.1.4.1 Aluminum Jackets

Aluminum jackets shall be corrugated, embossed or smooth sheet, 0.016 inch nominal thickness; ASTM B 209, Temper H14, Temper H16, Alloy 3003, 5005, or 3105 with factory applied moisture retarder. Corrugated aluminum jacket shall not be used outdoors. Aluminum jacket securing bands shall be Type 304 stainless steel, 0.015 inch thick, 1/2 inch wide for pipe under 12 inch diameter and 3/4 inch wide for pipe over 12 inch and larger diameter. Aluminum jacket circumferential seam bands shall be 2 x 0.016 inch aluminum matching jacket material. Bands for insulation below ground shall be 3/4 x 0.020 inch) thick stainless steel, or fiberglass reinforced tape. The jacket may, at the option of the Contractor, be provided with a factory fabricated Pittsburg or "Z" type longitudinal joint. When the "Z" joint is used, the bands at the circumferential joints shall be designed by the manufacturer to seal the joints and hold the jacket in place.

#### 2.1.5 Vapor Retarder Coating

##### 2.1.5.1 Vapor Retarder Not Required

ASTM C 1136, Type III, maximum moisture vapor transmission 0.10 perms, minimum puncture resistance 50 Beach units on all surfaces except ductwork, where Type IV, maximum moisture vapor transmission 0.10, a minimum puncture resistance of 25 Beach units is acceptable.

#### 2.1.6 Wire

Soft annealed ASTM A 580/A 580M Type 302, 304 or 316 stainless steel, 16 or 18 gauge.

#### 2.1.7 Sealants

Sealants shall be chosen from the butyl polymer type, the styrene-butadiene rubber type, or the butyl type of sealants. Sealants shall have a maximum moisture vapor transmission of 0.02 perms, and a maximum flame spread/smoke developed index of 25/50 per ASTM E 84.

### 2.2 PIPE INSULATION MATERIALS

Pipe insulation materials shall be limited to those listed herein and shall meet the following requirements:

#### 2.2.1 Aboveground Hot Pipeline

Insulation for above 60 degrees F, for outdoor, indoor, exposed or concealed applications shall meet the following requirements. Supply the insulation with manufacturer's recommended factory-applied jacket.

- a. Calcium Silicate: ASTM C 533, Type I indoor only, or outdoors above 250 degrees F pipe temperature. Supply insulation with the manufacturer's recommended factory-applied jacket.

### PART 3 EXECUTION

### 3.1 APPLICATION - GENERAL

Insulation shall only be applied to unheated and uncooled piping and equipment.

#### 3.1.1 Installation

Except as otherwise specified, material shall be installed in accordance with the manufacturer's written instructions. Insulation materials shall not be applied until tests specified in other sections of this specification are completed. Material such as rust, scale, dirt and moisture shall be removed from surfaces to receive insulation. Insulation shall be kept clean and dry. Insulation shall not be removed from its shipping containers until the day it is ready to use and shall be returned to like containers or equally protected from dirt and moisture at the end of each workday. Insulation that becomes dirty shall be thoroughly cleaned prior to use. If insulation becomes wet or if cleaning does not restore the surfaces to like new condition, the insulation will be rejected, and shall be immediately removed from the jobsite. Joints shall be staggered on multi layer insulation. Mineral fiber thermal insulating cement shall be mixed with demineralized water when used on stainless steel surfaces. Insulation, jacketing and accessories shall be installed in accordance with MICA Insulation Stds plates except where modified herein or on the drawings.

#### 3.1.2 Welding

No welding shall be done on piping, duct or equipment without written approval of the Contracting Officer.

#### 3.1.3 Pipes/Ducts/Equipment which Require Insulation

Insulation is required on all pipes except for electrical conduit, as specified.

### 3.2 PIPE INSULATION INSTALLATION

#### 3.2.1 Pipe Insulation

##### 3.2.1.1 General

Pipe insulation shall be installed on aboveground hot pipeline systems as specified below to form a continuous thermal retarder, including straight runs, fittings and appurtenances unless specified otherwise. Installation shall be with full length units of insulation and using a single cut piece to complete a run. Cut pieces or scraps abutting each other shall not be used.

##### 3.2.1.2 Pipes Passing Through Walls, Roofs, and Floors

- a. Pipe insulation shall be continuous through the sleeve.
- b. An aluminum jacket shall be provided over the insulation wherever penetrations require sealing.

- c. The aluminum jacket shall extend 2 inches beyond either face of the concrete monolith and shall be secured on each end with a band.

#### 3.2.1.3 Pipes Passing Through Hangers

- a. Insulation, whether hot or cold application, shall be continuous through hangers. All horizontal pipes 2 inches and smaller shall be supported on hangers with the addition of a Type 40 protection shield to protect the insulation in accordance with MSS SP-69. Whenever insulation shows signs of being compressed, or when the insulation or jacket shows visible signs of distortion at or near the support shield, insulation inserts as specified below for piping larger than 2 inches shall be installed.
- b. Horizontal pipes larger than 2 inches at 60 degrees F and above shall be supported on hangers in accordance with MSS SP-69.
- c. Vertical pipes shall be supported with either Type 8 or Type 42 riser clamps with the addition of two Type 40 protection shields in accordance with MSS SP-69 covering the 360-degree arc of the insulation. An insulation insert of cellular glass or calcium silicate shall be installed between each shield and the pipe. The insert shall cover the 360-degree arc of the pipe. Inserts shall be the same thickness as the insulation, and shall extend 2 inches on each end beyond the protection shield. When insulation inserts are required per the above, and the insulation thickness is less than 1 inch, wooden or cork dowels or blocks may be installed between the pipe and the shield to prevent the hanger from crushing the insulation, as an option instead of installing insulation inserts. The insulation jacket shall be continuous over the wooden dowel, wooden block, or insulation insert. The vertical weight of the pipe shall be supported with hangers located in a horizontal section of the pipe. When the pipe riser is longer than 30 feet, the weight of the pipe shall be additionally supported with hangers in the vertical run of the pipe that are directly clamped to the pipe, penetrating the pipe insulation. These hangers shall be insulated and the insulation jacket sealed as indicated herein for anchors in a similar service.
- d. Inserts shall be covered with a jacket material of the same appearance and quality as the adjoining pipe insulation jacket, shall overlap the adjoining pipe jacket 1-1/2 inches, and shall be sealed as required for the pipe jacket.

#### 3.2.1.4 Pipes in Tunnel or Trench.

In the tunnel and trench areas aluminum jackets shall be utilized.

#### 3.2.2 Aboveground Hot Pipelines

The following hot pipelines above 60 degrees F shall be insulated per Table II:

- a. Steam.
- b. Condensate.

3.2.2.1 Insulation Thickness

Insulation thickness for hot pipelines shall be determined using Table II.

LEGEND:

CS - Calcium Silicate

Table II - Hot Piping Insulation Thickness  
Pipe Size (inches)

Type of Service (degrees F)	Material	Run-outs up to 2 in *	1 in & less	1.25 - 2 in	2.5 - 4 in	5 - 6 in	8 in & larger
Steam & condensate return (201-250 F)	CS		1.5	2.0	2.5	2.5	3.5
Steam (251 - 350F)		1.5	2.5	3.0	3.5	3.5	4.0
		1.5	2.0	2.5	2.5	3.0	3.5
	CS	1.5	2.5	2.5	3.5	3.5	4.5
Steam (351 - 500 F)		2.0	3.5	4.0	4.5	5.0	5.5
		1.5	3.0	3.5	4.0	4.0	4.5
	CS	2.0	3.5	4.0	4.5	5.0	5.5

3.2.2.2 Jacket for Insulated Hot Pipe

Insulation shall be covered, in accordance with manufacturer's recommendations, with field applied aluminum.

3.2.2.3 Insulation for Straight Runs

- a. Insulation shall be applied to the pipe with joints tightly butted.
- b. Longitudinal laps of the jacket material shall overlap not less than 1-1/2 inches, and butt strips 3 inches wide shall be provided for circumferential joints.

- c. Laps and butt strips shall be secured with adhesive and stapled on 4 inch centers if not factory self-sealing. Adhesive may be omitted where pipe is concealed.
- d. Factory self-sealing lap systems may be used when the ambient temperature is between 40 degrees and 120 degrees F and shall be installed in accordance with manufacturer's instructions. Laps and butt strips shall be stapled whenever there is non-adhesion of the system. Where gaps occur, the section shall be replaced or the gap repaired by applying adhesive under the lap and then stapling.
- e. Breaks and punctures in the jacket material shall be patched by either wrapping a strip of jacket material around the pipe and securing with adhesive and staple on 4 inch centers (if not factory self-sealing), or patching with tape and sealing with a brush coat of vapor retarder coating. Adhesive may be omitted where pipe is concealed. Patch shall extend not less than 1-1/2 inches past the break.

#### 3.2.2.4 Insulation for Fittings and Accessories

- a. Pipe insulation shall be tightly butted to the insulation of the fittings and accessories.
- b. Precut or preformed insulation shall be placed around all fittings and accessories and shall conform to MICA plates, except as modified herein: 5 for anchors; 10, 11, 12, and 13 for fittings; 14, 15 and 16 for valves; 17 for flanges and unions; and 18 for couplings. Insulation shall be the same as the pipe insulation, including same density, thickness, and thermal conductivity. Where precut/preformed is unavailable, rigid preformed pipe insulation sections may be segmented into the shape required. Insulation of the same thickness and conductivity as the adjoining pipe insulation shall be used. If nesting size insulation is used, the insulation shall be overlapped 2 inches or one pipe diameter. Elbows insulated using segments shall conform to MICA Tables 12.20 "Mitered Insulation Elbow".
- c. Upon completion of installation of insulation on flanges, unions, valves, anchors, fittings and accessories, terminations and insulation not protected by jackets shall be protected with two coats of adhesive applied with glass tape embedded between coats. Tape seams shall overlap 1 inch. Adhesive shall extend onto the adjoining insulation not less than 2 inches. The total dry film thickness shall be not less than 1/16 inch.
- d. Insulation terminations shall be tapered to unions at a 45-degree angle.

#### 3.2.3 Piping Exposed to Weather

### 3.2.3.1 Aluminum Jacket

The jacket shall overlap not less than 2 inches at longitudinal and circumferential joints and shall be secured with bands at not more than 12 inch centers. Longitudinal joints shall be overlapped down to shed water and located at 4 or 8 o'clock positions. Joints on piping 60 degrees F and below shall be sealed with caulking while overlapping to prevent moisture penetration. Where jacketing on piping 60 degrees F and below abuts an un-insulated surface, joints shall be caulked to prevent moisture penetration. Joints on piping above 60 degrees F shall be sealed with a moisture retarder.

### 3.2.3.2 Insulation for Fittings

Flanges, unions, valves, fittings, and accessories shall be insulated and finished as specified for the applicable service. Factory preformed aluminum jackets shall be used.

-- End of Section --

## SECTION 15562A

HEATING AND UTILITIES SYSTEMS, CENTRAL STEAM  
07/01

## 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 53/A 53M	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 106	(1999e1) Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A 181/A 181M	(2000) Carbon Steel Forgings, for General-Purpose Piping
ASTM A 366/A 366M	(1997e1) Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality
ASTM A 504	(1993) Wrought Carbon Steel Wheels
ASTM A 569/A 569M	(1998) Commercial Steel (CS) Sheet and Strip, Carbon (0.15 Maximum Percent), Hot-Rolled
ASTM A 653/A 653M	(2000) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 659/A 659M	(1997) Commercial Steel (CS) Sheet and Strip, Carbon (0.16 Maximum to 0.25 Maximum percent, Hot-Rolled.
ASTM A 733	(1999) Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
ASTM B 32	(1996) Solder Metal

## ASME INTERNATIONAL (ASME)

ASME B1.20.1	(1983; R 1992) Pipe Threads, General Purpose (Inch)
ASME B16.1	(1998) Cast Iron Pipe Flanges and Flanged

## Fittings

ASME B16.3	(1998) Malleable Iron Threaded Fittings
ASME B16.4	(1998) Gray Iron Threaded Fittings
ASME B16.5	(1996; B16.5a Pipe Flanges and Flanged Fittings NPS 1/2 thru NPS 24
ASME B16.9	(1993) Factory-Made Wrought Steel Buttwelding Fittings
ASME B16.21	(1992) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.39	(1998) Malleable Iron Threaded Pipe Unions Classes 150, 250, and 300
ASME B31.1	(1998) Power Piping
ASME BPVC SEC IX	(1998) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

## AMERICAN WELDING SOCIETY (AWS)

AWS A5.8	(1992) Filler Metals for Brazing and Braze Welding
AWS D1.1	(2002) Structural Welding Code - Steel

## EXPANSION JOINT MANUFACTURERS ASSOCIATION (EJMA)

EJMA Stds	(1998; 7th Edition) EJMA Standards
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## MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-25	(1998) Standard Marking System for Valves, Fittings, Flanges and Unions
MSS SP-58	(1993) Pipe Hangers and Supports - Materials, Design and Manufacture
MSS SP-69	(1996) Pipe Hangers and Supports - Selection and Application
MSS SP-70	(1998) Cast Iron Gate Valves, Flanged and Threaded Ends
MSS SP-71	(1997) Cast Iron Swing Check Valves,

## Flanges and Threaded Ends

MSS SP-80	(1997) Bronze Gate, Globe, Angle and Check Valves
MSS SP-85	(1994) Cast Iron Globe & Angle Valves, Flanged and Threaded Ends

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

Drawings; G|ED  
Installation; G|AR

Detail drawings consisting of schedules, performance charts, brochures, diagrams, drawings, and instructions necessary for installation of the systems as specified. Detail drawings for pumping units and appurtenances, including controls. Drawings shall indicate clearances required for maintenance and operation and shall also contain complete wiring and schematic diagrams, equipment layout and anchorage, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit.

Pipe Anchors; G|ED

Detailed drawings of pipe anchors, before installation.

## SD-03 Product Data

Welding  
System Equipment; G|ED

A copy of qualified procedures and a list of names and identification symbols of qualified welders and welding operators.

Spare parts data for each item of equipment provided, after approval of the drawings and not later than 2 months before the date of beneficial occupancy. The data shall include a complete list of spare parts and supplies, with current unit prices and supplies, with current unit prices and supply sources.

Framed Instructions

Proposed diagrams, instructions, and other sheets, before posting.

## SD-06 Test Reports

## Adjusting, Balancing, Testing and Inspecting; G|AR

Test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completing and testing the system. Each test report shall indicate the final position of controls.

## SD-10 Operation and Maintenance Data

## Heating and Utilities System

Six complete copies of operation manuals outlining the step-by-step procedures required for system startup, operation, and shutdown. The manuals shall include the manufacturer's name, model number, service manual, parts list, and a brief description of all equipment and their basic operating features. Six complete copies of maintenance manuals listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The manuals shall include piping layout, equipment layout, and simplified wiring and control diagrams of the system as installed.

## 1.3 GENERAL REQUIREMENTS

## 1.3.1 Standard Products

Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

## 1.3.2 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a plate secured to the item of equipment.

## 1.3.3 Prevention of Rust

Unless otherwise specified, surfaces of ferrous metal subject to corrosion shall be factory prime painted with a rust inhibiting coating and subsequently factory finish painted in accordance with the manufacturer's standard practice. Equipment exposed to high temperature when in service shall be prime and finish painted with the manufacturer's standard heat resistant paint to a minimum thickness of 1 mil.

## 1.3.4 Equipment Guards and Access

Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and

other rotating parts exposed to personnel contact shall be fully enclosed or guarded. High temperature equipment and piping exposed to contact by personnel or where a fire hazard will be created shall be properly guarded or covered with insulation of a type specified.

#### 1.3.5 Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing any work.

#### 1.3.6 Welding

Piping shall be welded in accordance with qualified procedures using performance-qualified welders and welding operators. Procedures and welders shall be qualified in accordance with ASME BPVC SEC IX. Welding procedures qualified by others, and welders and welding operators qualified by another employer may be accepted as permitted by ASME B31.1. The Contracting Officer shall be notified 24 hours in advance of tests and the tests shall be performed at the work site if practical. The welder or welding operator shall apply his assigned symbol near each weld he makes as a permanent record.

#### 1.3.7 Manufacturer's Services

Services of a manufacturer's representative who is experienced in the installation, adjustment, and operation of the equipment specified shall be provided. The representative shall supervise installing, adjusting, and testing the equipment.

#### 1.3.8 Field Training

Contractor shall conduct a training course for the maintenance and operating staff. The training period of 3 hours normal working time shall start after the system is functionally complete but before the final acceptance tests. The training shall include all of the items contained in the approved operating and maintenance instructions as well as demonstrations of routine maintenance operations. Contracting Office shall be given at least 2 weeks advance notice of such training.

#### 1.3.9 Use of Asbestos Products

Products which contain asbestos are prohibited. This prohibition includes items such as packings or gaskets, even though the item is encapsulated or the asbestos fibers are impregnated with binder material.

#### 1.4 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from weather, humidity and temperature variations, dirt and dust, or other contaminants.

### PART 2 PRODUCTS

## 2.1 MATERIALS

Materials shall conform to the following:

### 2.1.1 Iron and Steel Sheets

#### 2.1.1.1 Galvanized Iron and Steel

ASTM A 659/A 659M, ASTM A 653/A 653M with general requirements conforming to ASTM A 504. Gauge numbers specified refer to manufacturer's standard gauge.

#### 2.1.1.2 Uncoated (Black) Steel

ASTM A 366/A 366M or ASTM A 569/A 569M, composition, condition, and finish best suited to the intended use. Gauge numbers specified refer to manufacturer's standard gauge.

### 2.1.2 Pipe and Pipe Fittings

#### 2.1.2.1 Cast Iron Pipe Fittings

ASME B16.1 or ASME B16.4, Class 125, type to match adjacent piping.

#### 2.1.2.2 Malleable Iron Pipe Fittings

ASME B16.3, type required to match adjacent piping.

#### 2.1.2.3 Nipples

ASTM A 733, standard weight.

#### 2.1.2.4 Pipe

ASTM A 53/A 53M or ASTM A 106, Grade A or B, black steel. Pipe shall be standard weight unless otherwise specified.

#### 2.1.2.5 Welding Fittings for Pipe

ASME B16.9.

#### 2.1.2.6 Pipe Flanges and Flanged Fittings

Steel flanges, ASTM A 181/A 181M and ASME B16.5. Convolute flanges shall mate with ASME B16.5, Class 150 flanges. Flanges and fittings shall have the manufacturer's trademark affixed in accordance with MSS SP-25 so as to permanently identify the manufacturer.

#### 2.1.2.7 Pipe Hangers, Inserts, and Supports

MSS SP-58 and MSS SP-69.

#### 2.1.2.8 Pipe Threads

ASME B1.20.1.

#### 2.1.2.9 Solder, Silver

AWS A5.8, or the solder metal shall conform to ASTM B 32 95-5 tin antimony.

#### 2.1.2.10 Unions

ASME B16.39, type to match adjacent piping.

#### 2.1.2.11 Gaskets

ASME B16.21. Approved metallic self-centering style and ring style gasket consisting of metallic retainer and sealing gland may be used for intended service.

### 2.1.3 Valves

#### 2.1.3.1 Check Valves

- a. Sizes 3 inches and less, bronze: MSS SP-80, Type 3 or 4, Class 125.
- b. Sizes 2 inches through 24 inches, cast iron: MSS SP-71, Type III or IV, Class 125.

#### 2.1.3.2 Globe Valves

- a. Sizes 3 inches and less, bronze: MSS SP-80, Type 1, 2, and 3, Class 125.
- b. Sizes 2 inches through 12 inches, cast iron: MSS SP-85, Type III, Class 125.

#### 2.1.3.3 Angle Valves

- a. Sizes 3 inches and less, bronze: MSS SP-80, Type 1, 2, or 3, Class 125.
- b. Sizes 2 inches through 12 inches, cast iron: MSS SP-85, Type IV, Class 125.

#### 2.1.3.4 Gate Valves

- a. Sizes 3 inches and less, bronze: MSS SP-80, Type 1 or 2, Class 125.
- b. Sizes 2 inches through 48 inches, cast iron: MSS SP-70, Type I, Class 125, Design OT or OF (OS & Y), bronze trim.

## 2.2 PIPING AND ACCESSORIES

### 2.2.1 Pipe and Fittings

#### 2.2.1.1 Steam Piping and Fittings

Piping shall be black steel, conforming to ASTM A 53/A 53M, Grade A. Fittings shall be black, malleable iron or steel. Fittings adjacent to valves shall suit valves specified. Reducing fittings shall be used for changes in pipe sizes. In horizontal steam lines, reducing fittings shall be the eccentric type to maintain the bottom of the lines at the same level.

#### 2.2.1.2 Condensate Return Piping and Fittings

Piping shall be black steel, extra strong weight, conforming to ASTM A 53/A 53M, Grade A. Fittings shall be cast iron or malleable iron, extra heavy.

#### 2.2.1.3 Vent Piping and Fittings

Piping shall be black steel, conforming to ASTM A 53/A 53M, Grade A. Fittings shall be black malleable iron to suit piping. Plastic materials are forbidden to be used for vent piping.

#### 2.2.1.4 Gauge Piping

Piping shall be copper tubing, Type K or L, for steam and condensate 25 psig and less and steel for greater than 25 psig.

#### 2.2.2 Joints

Except as otherwise specified, fittings used on steel pipe shall be threaded for fittings 1-3/4 inches and smaller; and flanged or welded for fittings 2 inches and larger. Unless otherwise specified, connections to equipment shall be made with black malleable iron unions for pipe 1-3/4 inches or smaller in diameter, and with flanges for pipe 2 or more inches in diameter.

#### 2.2.2.1 Bellows-Type Joints

Joints shall be flexible, guided type. Expansion element shall be stainless steel. Joints shall be in accordance with the applicable requirements of EJMA Stds and ASME B31.1 with internal liners.

#### 2.3 FACTORY COATING

Standard rust inhibiting primer. Equipment and component items, when fabricated from ferrous metal, shall be factory finished with the manufacturer's standard finish.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

All work shall be installed as indicated and in accordance with the manufacturer's diagrams and recommendations.

#### 3.1.1 Piping

Unless otherwise specified, pipe and fitting installation shall conform to the requirements of ASME B31.1. Pipe shall be cut accurately to measurements established at the jobsite and worked into place without springing or forcing. Cutting or other weakening of the building structure to facilitate piping installation will not be permitted without written approval. Piping or tubing shall be cut square, shall have burrs removed by reaming, and shall be so installed as to permit free expansion and contraction without causing damage to structure, pipe, joints, or hangers. Filings, dust, or dirt shall be wiped from interior of the pipe or tubing before connections are made. Changes in direction shall be made with fittings. Horizontal supply mains shall pitch up or down in the direction of flow. The grade shall be not less than 1 inch in 40 feet. Where the required pitch of the supply line cannot be accomplished because of the profile of the existing pipes, the Contractor shall provide a riser pipe with drip leg. The drip shall include dirt leg, inverted bucket steam trap sized in accordance with the expected condensate flow for unsupervised warm-up, isolation valves for the trap and a throttled bypass for the trap to avoid having to shut down steam service during maintenance. The entire drip station shall be submitted by the Contractor for approval prior to any fabrication. Reducing fittings shall be used for changes in pipe sizes. Open ends of pipelines and equipment shall be capped or plugged during installation to keep dirt or other foreign materials out of the systems. Pipe not otherwise specified shall be uncoated. Connections between ferrous piping and copper piping shall be electrically isolated from each other with dielectric waterways.

#### 3.1.1.1 Welded Joints

Welded joints shall be fusion-welded unless otherwise required. Changes in direction of piping shall be made with welding fittings only. Branch connection may be made with either welding tees or forged branch outlet fittings. Branch outlet fittings shall be forged, flared for improvement of flow where attached to the run, and reinforced against external strains. Beveling, alignment, heat treatment, and inspection of weld shall conform to ASME B31.1. Weld defects shall be removed and repairs made to the weld, or the weld joints shall be entirely removed and rewelded at no additional cost to the Government. Electrodes shall be stored and dried in accordance with AWS D1.1 or as recommended by the manufacturer. Electrodes that have been wetted or that have lost any of their coating shall not be used.

#### 3.1.1.2 Flanges

Flanges shall be faced true, and made square and tight. Gaskets shall be nonasbestos compressed material in accordance with ASME B16.21, 1/16 inch thickness, full face or self-centering flat ring type. The gaskets shall contain aramid fibers bonded with styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR).

#### 3.1.2 Supports

##### 3.1.2.1 General

Hangers used to support piping 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load.

Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain.

### 3.1.2.2 Pipe Hangers, Inserts, and Supports

Pipe hangers, inserts and supports shall conform to MSS SP-58 and MSS SP-69, except as modified herein.

- a. Types 5, 12, and 26 shall not be used.
- b. Type 3 shall not be used on insulated pipe.
- c. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for type 18 inserts.
- d. Type 19 and 23 C-clamps shall be torqued per MSS SP-69 and have both locknuts and retaining devices, furnished by the manufacturer. The C-clamp body shall not be constructed from bent plate.
- e. Type 20 attachments used on angles and channels shall be furnished with an added malleable iron heel plate or adapter.
- f. Type 24 may be used only on trapeze hanger systems or on fabricated frames.
- g. Where type 39 saddle or type 40 shield are permitted for a particular pipe attachment application, the type 39 saddle welded to the pipe, shall be used on all pipe 4 inches and larger when the temperature of the medium is 60 degrees F or higher. Type 40 shields shall be used on all piping less than 4 inches and all piping 4 inches and larger carrying medium less than 60 degrees F. A high density insulation insert of a density 8 pcf or greater shall be used under the type 40 shield for piping 2 inches and larger.
- h. Horizontal pipe supports shall be spaced as specified in MSS SP-69 and a support shall be installed not over 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 5 feet apart at valves. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for any of the individual pipes in the multiple pipe run. The clips or clamps shall be rigidly connected to the common base member. A clearance of 1/8 inch shall be provided between the pipe and clip or clamp for all piping which may be subjected to thermal expansion.
- i. Vertical pipe shall be supported at intervals of not more than 8 feet from end of risers.

- j. Type 35 guides using steel, reinforced PTFE or graphite slides shall be provided where required to allow longitudinal pipe movement. Lateral restraints shall be provided as required. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions, and bearing loads encountered.
  - (1) Where steel slides do not require provisions for restraint of lateral movement, an alternate guide method may be used. On piping 4 inches and larger carrying medium 60 degrees F or higher, a type 39 saddle may be welded to the pipe and freely rest on the steel plate. On piping under 4 inches and piping 4 inches and larger carrying medium less than 60 degrees F a type 40 protection shield may be attached to the pipe or insulation and freely rest on a steel plate. A high density insulation insert of density 8 pcf or greater shall be used under all shields on piping 2 inches and larger.
  - (2) Where there are high system temperatures and welding to piping is not desirable, then the type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 4 inches, or by an amount adequate for the insulation, whichever is greater.
- k. Pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation. The insulation shall be continuous through the hanger on all pipe sizes and applications.
- l. Piping in trenches shall be supported as indicated.

### 3.1.3 Pipe Sleeves

Pipe passing through concrete or masonry walls or concrete floors or roofs shall be provided with pipe sleeves fitted into place at the time of construction. Rectangular and square openings shall be as detailed on the drawings. Each sleeve shall extend through its respective wall, floor, or roof, and shall be cut flush with each surface, unless otherwise indicated.

Unless otherwise indicated, sleeves shall be of such size as to provide a minimum of 1/4 inch all around clearance between sleeve and bare pipe or insulation surface. Sleeves in walls, waterproofing membrane floors, and wet areas shall be steel pipe or cast-iron pipe. The annular space between pipe and sleeve or between jacket over insulation and sleeve shall be sealed as indicated.

#### 3.1.3.1 Optional Sealing of Uninsulated Pipes

A modular mechanical type sealing assembly may be installed. The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe/conduit and sleeve with corrosion-protected carbon steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve,

tightening of the bolt shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe/conduit and the sleeve. Each seal assembly shall be sized as recommended by the manufacturer to fit the pipe/conduit and sleeve involved. The Contractor electing to use the modular mechanical type seals shall provide sleeves of the proper diameters.

#### 3.1.4 Pipe Anchors

Anchors shall be provided where necessary to localize expansion or prevent undue strain on piping. Anchors shall consist of heavy steel collars with lugs and bolts for clamping and attaching anchor braces, unless otherwise indicated. Anchor braces shall be installed using turnbuckles where required. Supports, anchors, or stays shall be located to prevent damage by installation operations or by the weight or expansion of the pipeline.

#### 3.1.5 Pipe Expansion

The expansion of supply and return pipes shall be provided for by changes in the direction of the run of pipe or by expansion joints. Condensate and steam expansion joints shall be one of the types specified.

##### 3.1.5.1 Slip-Tube Type Expansion Joints

Slip-tube type expansion joints shall be used for steam and condensate systems only. Joints shall provide for either single or double slip of the connected pipes and temperature and pressure suitable for application, in no case less than 150 psig. Joints shall be in accordance with applicable requirements of EJMA Stds and ASME B31.1, Type I or III. End connections shall be flanged. Anchor bases or support bases shall be provided as required. Initial setting shall be made in accordance with the manufacturer's recommendations to allow for ambient temperature at time of installation. Pipe alignment guides shall be installed as recommended by the joint manufacturer, but shall be not more than 5 feet from expansion joint, except in lines 4 inches or smaller where guides shall be installed not more than 2 feet from the joint.

##### 3.1.5.2 Bellows-Type Joint

Bellows-type joint design and installation shall comply with EJMA Stds. The joints shall be designed for the working temperature and pressure suitable for the application and shall be not less than 150 psig in any case.

#### 3.1.6 Insulation

Thickness and application of insulation materials for piping and equipment shall be in accordance with Section 15080 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

### 3.2 ADJUSTING, BALANCING, TESTING AND INSPECTING

#### 3.2.1 Field Tests

The Contractor shall notify the Contracting Officer 10 days before the

performance and acceptance tests are to be conducted. The tests shall be performed in the presence of the Contracting Officer. The Contractor shall furnish all instruments and personnel required for the tests. Steam shall be furnished by the Contractor by obtaining a portable steam generator to charge the lines prior to the commencement of the normal heating season. The Contractor shall be responsible for identifying and actuating all valves necessary to isolate to portion of the piping system under test. Under no circumstances shall the test steam be permitted to energize the courthouse distribution system or to back feed the central energy plant. In the event that no isolation valves are available, the Contractor shall be open convenient flanged joints and install blind flanges on both sides of the test section.

#### 3.2.1.1 Piping

Before thermal insulation is installed, the system, shall be hydrostatically tested at 1-1/2 times the design operating pressure for a minimum of 4 hours.

#### 3.2.2 Cleaning and Adjusting

After hydrostatic tests have been made and prior to the operating tests, piping shall be thoroughly cleaned and flushed with fresh water. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. The Contractor shall be responsible for maintaining the system in a clean condition until final acceptance.

#### 3.2.3 System Operation

Upon completion and prior to acceptance of the project, the installation shall be subjected to such operating tests as may be required to demonstrate that the steam heating system will operate. Tests shall be conducted by a qualified test engineer at such times as directed. The Contractor shall provide instruments, facilities, and labor required to conduct the tests. Indicating instruments shall be read at 1/4-hour intervals, unless otherwise directed. Tests shall cover a period of 3 or more hours for each system tested, and test reports shall include the following applicable specific information together with conclusions as to the adequacy of the system:

Time, date, and duration of test.

Flow and pressure of steam at the courthouse.

#### 3.2.4 Retesting

Any deficiencies revealed during testing shall be corrected and tests shall be reconducted.

-- End of Section --