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SECTION 01312

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 RESIDENT MANAGEMENT SYSTEM (RMS) AND QUALITY CONTROL SYSTEM (QCS)

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. The Contractor module, user manuals, updates, and training information can be downloaded from the RMS web site. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Import/Export of Data

1.1.1 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.2 Other Factors

Particular attention is directed to Contract Clause, "Payments Under Fixed-Price Construction Contracts"; Section 01320, "PROJECT SCHEDULE;" Section 01330, "SUBMITTAL PROCEDURES;" and Section 01451, "CONTRACTOR QUALITY CONTROL;" which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the contract pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the construction contract. Prior to the Pre-Construction Conference, the Contractor shall be responsible to

download, install and use the latest version of the QCS software from the Government's RMS Internet Website. Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

Hardware

IBM-compatible PC with 500 MHz Pentium or higher processor

128+ MB RAM for workstation / 256+ MB RAM for server

1 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact disk (CD) Reader, 8x speed or higher

SVGA or higher resolution monitor (1024 x 768, 256 colors)

Mouse or other pointing devise

Windows compatible printer (Laser printer must have 4+ MB of RAM)

Connection to the Internet, minimum 56 BPS

Software

MS Windows 98, ME, NT, or 2000

Word Processing software compatible with MS Word 97 or newer

Latest version of: Netscape Navigator, Microsoft Internet Explorer, or other browser that supports HTML 4.0 or higher

Electronic mail (E-mail), MAPI compatible

Virus protection software that is regularly upgraded with all issued manufacturer's updates

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website; the Contractor can obtain the current address from the Government. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control(CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager during the mandatory CQC Training class.

1.5 CONTRACT DATABASE

Prior to the pre-construction conference, the Government shall provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see paragraph "DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM"). The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed under the contract, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other Contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a Contractor Quality Control (CQC) Plan within the time required in Section 01451, "CONTRACTOR QUALITY CONTROL." Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted CQC Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451, "CONTRACTOR QUALITY CONTROL." Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking.

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 300.

1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.6.4 Submittal Management

The Government will provide the initial submittal register in electronic format. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update shall be produced using QCS. RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Section 01320, "PROJECT SCHEDULE." This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01320, "PROJECT SCHEDULE"). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the Government with schedule update and progress payment request. As required in Contract Clause "Payments Under Fixed-Price Construction Contracts," at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. 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.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01320

PROJECT SCHEDULE

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SECTION 01320

PROJECT SCHEDULE

PART 1 GENERAL

1.1 REFERENCES

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.

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

1.2 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

The Contractor shall prepare a Project Schedule as described below. 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. Contract monitoring and administration shall be performed in accordance with Section 01312, "QUALITY CONTROL SYSTEM (QCS)."

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, 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 Critical Activities

The following activities shall be listed as separate line activities on the Contractor's project schedule:

a. Submission and approval of as-built drawings.

b. Prefinal inspection.

c. Correction of punchlist from prefinal inspection.

d. Final inspection.

3.3.2.4 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.

3.3.2.5 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, Contractor work force, or Government agency performing a given task. Activities shall not belong to more than one responsible party. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.6 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.

3.3.2.7 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.

3.3.2.8 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.9 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.

3.3.2.10 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 permits, submittals, approvals, procurement, fabrication, delivery, installation, and testing. The category of work for each activity shall be identified by the Category of Work Code.

3.3.2.11 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.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from NTP to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date on which the 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 called "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 the 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 the NTP is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 60 calendar days after NTP.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 40 calendar days after NTP. 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 paragraph "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, initial 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 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. Preceeding 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 NTP 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 on-site 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 shall 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 NTP 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 or planned 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 NTP 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 the 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 --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

-- End of Section Table of Contents --

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 PAYMENT

No separate payment will be made for any requirements under this Section and all costs of implementation shall be included in the payment item(s) shown in Section 00010, "SOLICITATION, OFFER AND AWARD (SF 1442) AND BIDDING SCHEDULE."

1.2 SUBMITTAL IDENTIFICATION (SD)

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

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1 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 (Section 00700) entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.1.1 Designated Reviewers

The organization designated to perform the review for approval for items requiring Government approval (G) is identified by acronym in the (f) (CLASSIFICATION/GOVT OR A/E REVWR) column on the SUBMITTAL REGISTER. Following is a list of the acronyms used and their full description:

AOF = The Resident U.S. Army Corps of Engineers Area Office

TSD = Technical Services Division, Design Branch, Buffalo District, U.S. Army Corps of Engineers

1.3.2 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.

1.4 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.

1.5 DISAPPROVED SUBMITTALS

When a submittal is returned to the Contractor and marked "DISAPPROVED" or "APPROVED - SUBJECT TO CONDITIONS INDICATED," 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 (Section 00700) "Changes" shall be given promptly to the Contracting Officer.

1.6 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 Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall submit all items listed on the Submittal Register and specified in other sections of these specifications. The Contracting Officer may request submittals in addition to those listed 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. Submittals shall be made in the respective number of copies and to the respective address set forth

below. 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

See list of attachments in Section 00100, "INSTRUCTIONS, CONDITIONS AND NOTICES TO BIDDERS" for Submittal Register, 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 shall maintain a submittal register for the project in accordance with Section 01312, "QUALITY CONTROL SYSTEM (QCS)." The Contractor will also be given the Submittal Register on a diskette that also contains instructions on the use of the diskette. Columns "c" through "f" have been completed by the Government; the Contractor shall complete columns "a" and "b" and "g" through "l" and submit the forms (two (2) hard copies plus associated electronic file) to the Contracting Officer for approval within 10 calender 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)

The sample transmittal form (ENG Form 4025), listed as an attachment in Section 00100, shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor, are included in the QCS software that the Contractor may be required to use for this contract, or may be copied from the attached form. This form

shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

3.5.1 Procedures

Submittals shall be made as stipulated in paragraph "Contractor Submittal Procedures" of the "SPECIAL CONTRACT REQUIREMENTS" (Section 00800) and as specified herein. Contractor shall forward four (4) copies of each submittal to the following Area Office:

U.S. ARMY CORPS OF ENGINEERS
Cleveland Area Office
1035 East 9th Street
Cleveland, OH 44114

3.5.2 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. The distribution of approved copies will be as specified in the Contract Clause (Section 00700) entitled "Specifications and Drawings for Construction."

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.

3.9 RESERVATION OF RIGHTS

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.

3.10 STAMPS

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

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01355

ENVIRONMENTAL PROTECTION

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SECTION 01355

ENVIRONMENTAL PROTECTION

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. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171 - 178	Hazardous Materials Regulations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is 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; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners,excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.5 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.6 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.7 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.8 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.9 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.10 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with "WETLAND MANUAL."

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this Section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this Section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this Section shall be included in the payment item(s) shown in Section 00010, "SOLICITATION, OFFER AND AWARD (SF1442) AND BIDDING SCHEDULE." The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, and local laws and regulations.

1.6 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

Environmental Protection Plan; G,TSD

The Environmental Protection Plan.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this Section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this Section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this Section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained on-site by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The Environmental Protection Plan shall include, but shall not be limited to, the following:

a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program.

e. Copies of certifications for personnel trained in environmental protection.

f. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas like trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, wetlands, historical, archaeological and cultural resources, structures and utilities.

i. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and the local Fire Department in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

j. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction.

k. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

l. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

m. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

n. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

o. A historical, archaeological, cultural resources plan that defines procedures for identifying and protecting historical, archaeological and cultural resources known to be on the project site: and/or identifies procedures to be followed if historical, archaeological and cultural resources not previously known to be on-site or in the area are discovered during construction. The plan shall include methods to

assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached, as an appendix, to the Environmental Protection Plan.

1.8 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.9 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, permits, and other elements of the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of the proposed corrective action and take such action when approved by the Contracting Officer. The Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations. The Government will not obtain any permits for this project; see Contract Clause "PERMITS AND RESPONSIBILITIES." The Ohio Environmental Protection Agency, through the National/State Pollutant Discharge Elimination System (N/SPDES), requires general permits or notice of intent for coverage under General Permit No. OHC000002 (OH), and a notice of termination for certain activities. The Contractor shall be responsible for implementing the terms and requirements of the appropriate permits as needed and for payment of all fees.

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques. The Contractor shall not park vehicles under the "drip line" of trees and shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, local laws and regulations and meet all applicable conditions of NPDES General Permit No. OH000002(OH). The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs). BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. Any temporary measures shall be removed after the area has been stabilized.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. The Contractor shall not create unnecessary turbidity which may degrade water quality or adversely affect aquatic life outside the project area. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials, such as from asphaltic batch plants; shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of Ohio rules.

3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval. Fires shall be confined to a closed vessel, guarded at all times, and shall be under constant surveillance until contents have burned out or have been extinguished. Burning shall completely reduce the materials to ashes.

3.5 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.5.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. The Contractor shall transport solid waste from the work area and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate. The Contractor shall comply with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.5.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in labeled corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.5.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262. The Contractor shall take sufficient

measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off the work site within 60 days in accordance with U.S. Environmental Protection Agency and U.S. Department of Transportation regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.

3.5.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.

3.5.5 Waste Water

Waste water from construction activities, such as on-site material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water off-Government property in accordance with all Federal, State, Regional and local laws and regulations.or by collecting and placing it in a retention pond where suspended material can be settled out and/or the water can evaporate to separate pollutants from the water. The site for the retention pond shall be coordinated and approved with the Contracting Officer. The residue left in the pond prior to completion of the project shall be removed, tested, and disposed off-Government property in accordance with Federal, State, and local laws and regulations. The area shall be backfilled to the original grade, top-soiled and seeded/sodded.

3.6 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.7 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any has been identified. The Contractor shall protect these resources and shall be responsible for their preservation during the life of the Contract. If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include, but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.8 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.9 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.10 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

3.11 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore landscape features damaged or destroyed during construction operations inside and outside the limits of the approved work areas.

3.12 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

-- End of Section Table of Contents --

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

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.

ACI INTERNATIONAL (ACI)
P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3700
Fax: 248-848-3701
Internet: http://www.aci-int.org

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
One East Wacker Dr., Suite 3100
Chicago, IL 60601-2001
Ph: 312-670-2400
Publications: 800-644-2400
Fax: 312-670-5403
Internet: http://www.aisc.org

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1819 L Street, NW, 6th Floor
Washington, DC 20036
Ph: 202-293-8020
Fax: 202-293-9287
Internet: http://www.ansi.org/

Note --- Documents beginning with the letter "S" can be ordered from:
Acoustical Society of America
2 Huntington Quadrangle, Suite 1NO1
Melville, NY 11747-4502
Ph: 516-576-2360
Fax: 516-576-2377
Internet: http://asa.aip.org
General e-mail: asa@aip.org

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
Internet: http://www.aws.org

ASME INTERNATIONAL (ASME)
Three Park Avenue
New York, NY 10016-5990
Ph: 212-591-7722
Fax: 212-591-7674
Internet: http://www.asme.org

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, PO Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
Internet: http://www.astm.org

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
933 N. Plum Grove Rd.
Schaumburg, IL 60173-4758
Ph: 847-517-1200
Fax: 847-517-1206
Internet: http://www.crsi.org/

FEDERAL STANDARDS (FED-STD)
Order from:
General Services Administration
Federal Supply Service Bureau
1941 Jefferson Davis Highway
Arlington, VA 22202
Ph: 703-605-5400
Internet: http://www.fss.gsa.gov/pub/fed-specs.cfm

MASTER PAINTERS INSTITUTE (MPI)
4090 Graveley Street
Burnaby, BC CANADA V5C 3T6
Ph: 888-674-8937
Fax: 888-211-8708
Internet: http://www.paintinfo.com/mpi

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
Ph: 617-770-3000
Fax: 617-770-0700
Internet: http://www.nfpa.org

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
100 Bureau Drive
Stop 3460
Gaithersburg, MD 20899-3460
Ph: 301-975-NIST
Internet: http://www.nist.gov

Order Publications From:
Superintendent of Documents
U.S. Government Printing Office
732 North Capitol Street, NW
Mailstop: SDE
Washington, DC 20401
Ph: 866-512-1800 or 202-512-1800
Fax: 202-512-2250
Internet: http://www.gpo.gov
or
National Technical Information Services (NTIS)
5285 Port Royal Rd.
Springfield, VA 22161
Ph: 703-605-6000
Fax: 703-605-6900
Internet: http://www.ntis.gov

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)
900 Spring St.
Silver Spring, MD 20910
Ph: 301-587-1400
Fax: 301-585-4219
Internet: http://www.nrmca.org

OHIO DEPARTMENT OF TRANSPORTATION (ODOT)
Office of Contracts
P.O. Box 899
Columbus, OH 43216-0899
Ph: 614-466-3778 or 614-466-3200
Internet: http://www.dot.state.oh.us/drrc/

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)
40 24th Street, 6th Floor
Pittsburgh, PA 15222-4656
Ph: 412-281-2331
Fax: 412-281-9992
Internet: http://www.sspc.org

U.S. ARMY CORPS OF ENGINEERS (USACE)
Order CRD-C (HANDBOOK FOR CONCRETE AND CEMENT)and RTH (ROCK TESTING HANDBOOK) DOCUMENTS from:
U.S. Army Engineer Waterways Experiment Station
ATTN: Technical Report Distribution Section, Services Branch, TIC
3909 Halls Ferry Rd.
Vicksburg, MS 39180-6199
Ph: 601-634-2664
Fax: 601-634-2388
Internet: http://www.wes.army.mil/SL/MTC/handbook/handbook.htm

Order Other Documents from:
USACE Publications Depot
Attn: CEIM-SP-D
2803 52nd Avenue
Hyattsville, MD 20781-1102
Ph: 301-394-0081
Fax: 301-394-0084
Internet: http://www.usace.army.mil/publications
or http://www.hnd.usace.army.mil/techinfo/index.htm

U.S. DEPARTMENT OF COMMERCE (DOC)
1401 Constitution Avenue, NW
Washington, DC 20230
Internet: http://www.commerce.gov/

Order Publications From:
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6000
Fax: 703-605-6900
Internet: http://www.ntis.gov

U.S. GENERAL SERVICES ADMINISTRATION (GSA)
General Services Administration
1800 F Street, NW
Washington, DC 20405
Ph: 202-501-0705

Order from:
General Services Administration
Federal Supply Service Bureau
1941 Jefferson Davis Highway
Arlington, VA 22202
Ph: 703-605-5400
Internet: http://www.fss.gsa.gov/pub/fed-specs.cfm

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
700 Pennsylvania Avenue, N.W.
Washington, D.C. 20408
Ph: 866-325-7208
Internet: http://www.archives.gov

Order documents from:
Superintendent of Documents
U.S.Government Printing Office
732 North Capitol Street, NW
Washington, DC 20401
Mailstop: SDE
Ph: 866-512-1800 or 202-512-1800
Fax: 202-512-2250
Internet: http://www.gpo.gov
E-mail: gpoaccess@gpo.gov

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01451

CONTRACTOR QUALITY CONTROL

SECTION 01451

CONTRACTOR QUALITY CONTROL

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.

ASTM INTERNATIONAL (ASTM)

ASTM D 3740	(2001) 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	(2002) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

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

Quality Control Plan; G,AOF

Contractor Quality Control Plan Checklist; G,AOF

The Contractor shall furnish for review by the Government, not later than ten (10) days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan along with the completed Contractor Quality Control Plan Checklist proposed to implement the requirements of Section 00700, CONTRACT CLAUSES, clause entitled "Inspection of Construction." A copy of the checklist is included as an attachment and listed in paragraph "LIST OF ATTACHMENTS" of Section 00100, "INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS."

1.3 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.

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 (Section 00700) titled "Inspection of Construction" and Section 01312, "QUALITY CONTROL SYSTEM (QCS)." 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 on-site and off-site, 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 QUALITY CONTROL PLAN

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 thirty (30) 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.

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, 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, off-site 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. (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 feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.2 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.

3.2.3 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven (7) calendar days prior to 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 ten (10) 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 on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will 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 on-site 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 graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 1 year of construction experience on construction similar to this contract or a construction person with a minimum of 3 years experience 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 only and not perform other duties at the project site. 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, materials technician and submittals clerk. These individuals shall be directly employed by the prime Contractor, unless waived in writing by the Contracting Officer, 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.

Experience Matrix

	Area	Qualifications
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.	Submittals	Submittal Clerk with 1 yr. experience.
c.	Concrete and Grout	Materials Technician with 2 yrs. experience for the appropriate area.

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". This course is periodically offered and arrangements for attendance can be made with the U.S. Army Engineer District, Buffalo; Technical Services Division, Construction Branch.

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 AND DELIVERABLES

Submittals 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 twenty-four (24) 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 twenty four (24) 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 on-site, 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, on-site 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 off-site 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 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $3,000.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-site 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

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Division Laboratory, f.o.b., at the following address:

Rock Laboratory Director
U.S. Army Engineer Research and Development Center
Waterways Experiment Station Site
Attn: CEERD-GM-C
3909 Halls Ferry Road
Vicksburg, MS 39180-6199
Ph: 601-634-3278

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the paragraph, "Commencement, Prosecution, and Completion of Work" of Section 00800, "SPECIAL CONTRACT REQUIREMENTS," or stated elsewhere in the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the

CQC documentation, as required by paragraph "DOCUMENTATION." The list of deficiencies 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 the 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 paragraph 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 of 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 twenty four (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 are listed as attachments in Section 00100, "INSTRUCTIONS, CONDITIONS, AND NOTICES TO BIDDERS."

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 --

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SECTION 01525

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

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 within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z359.1	(1992; R 1999) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
ASME B30.3	(1996) Construction Tower Cranes

ASME INTERNATIONAL (ASME)

ASME B30.22	(2000) Articulating Boom Cranes
ASME B30.5	(2000) Mobile and Locomotive Cranes
ASME B30.8	(2000) Floating Cranes and Floating Derricks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2002) Portable Fire Extinguishers
NFPA 241	(2000) Safeguarding Construction,Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1926	Safety and Health Regulations for Construction

29 CFR 1926.500 Fall Protection

1.2 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-01, Preconstruction Submittals

Accident Prevention Plan (APP); G,AOF

Activity Hazard Analysis (AHA); G,AOF

Crane Critical Lift Plan; G,AOF

Crane Work Plan; G,AOF

Proof of qualification for Crane Operators; G,AOF

SD-06, Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Regulatory Citations and Violations

Crane Reports

SD-07, Certificates

Confined Space Entry Permit

1.3 DEFINITIONS

a. Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.

b. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

c. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

d. Multi-Employer Work Site (MEWS). A multi-employer work site, as defined by OSHA, is one in which many employers occupy the same site. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.

e. Operating Envelope. The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).

f. Qualified Person for Fall Protection. A person with a recognized degree or professional certificate, extensive knowledge, training and experience in the field of fall protection who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.

g. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

(2) Days away from work;

(3) Restricted work;

(4) Transfer to another job;

(5) Medical treatment beyond first aid;

(6) Loss of consciousness; or

(7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

h. Site Safety and Health Officer (SSHO). The superintendent or other qualified or competent person who is responsible for the on-site safety and health required for the project. The Contractor quality control (QC) person can be the SSHO on this project.

i. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

j. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload;

and collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).

1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and all applicable Federal, State, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employee uses illegal drugs or consumes alcohol during work hours. Ensure there are no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine, or saliva specimens and test the injured and involved employees for the influence of drugs and alcohol. A copy of the test shall be made available to the Contracting Officer upon request.

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO shall meet the following requirements:

Level 2:

A minimum of 3 years safety work on similar project.

30-hour OSHA construction safety class or equivalent within last 3 years.

Competent person training as needed.

1.6.1.2 Competent Person for Confined Space Entry

Provide a competent person meeting the requirements of EM 385-1-1 who is assigned in writing by the Designated Authority to assess confined spaces and who possesses demonstrated knowledge, skill and ability to:

a. Identify the structure, location, and designation of confined and permit-required confined spaces where work is done;

b. Calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;

c. Perform all required tests and inspections specified in 29 CFR 1910.146 and 29 CFR 1915 Subpart B;

d. Assess hazardous conditions including atmospheric hazards in confined space and adjacent spaces and specify the necessary protection and precautions to be taken;

e. Determine ventilation requirements for confined space entries and operations;

f. Assess hazards associated with hot work in confined and adjacent space and determine fire watch requirements; and,

g. Maintain records required.

Since this work involves marine operations that handle combustible or hazardous materials, this qualified person shall be a NFPA certified marine chemist.

1.6.1.3 Crane Operators

Crane operators shall meet the requirements in USACE EM 385-1-1, Section 16 and Appendix G. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacitates of 50,000 pounds or greater, crane operators shall be designated as qualified by a source that qualifies crane operators (i.e., union, a government agency, or and organization that tests and qualifies crane operators). Proof of current qualification shall be provided.

1.6.2 Personnel Duties

1.6.2.1 Site Safety and Health Officer (SSHO)/Superintendent

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily quality control report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

a. The Contractor will be informed, in writing, of the date of the preconstruction conference. The purpose of the preconstruction conference is for the Contractor and the Contracting Officer's representatives to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project's Accident Prevention Plan (APP) before the initiation of work.

b. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the Project Superintendent, Site Safety and Health Officer, Quality Control Supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

c. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's Representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

d. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

1.6.3.2 Weekly Safety Meetings

Conduct weekly safety meetings at the project site for all employees. The Contracting Officer will be informed of the meeting in advance and be allowed attendance. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily quality control report.

1.6.3.3 Work Phase Meetings

The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection. The analysis should be used during daily inspections to ensure the implementation and effectiveness of safety and health controls.

1.7 TRAINING

1.7.1 New Employee Indoctrination

New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

1.7.2 Periodic Training

Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all on-site employees.

1.7.3 Training on Activity Hazard Analysis (AHA)

Prior to beginning a new phase, training will be provided to all affected employees to include a review of the AHA to be implemented.

1.8 ACCIDENT PREVENTION PLAN (APP)

The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Preparation of Accident Prevention Plan". Where a paragraph or subparagraph element is not applicable to the work to be performed indicate "Not Applicable" next to the heading. Specific requirements for some of the APP elements are described below at paragraph 1.8.1. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft

from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH. Submit the APP to the Contracting Officer 15 calendar days after the Notice To Proceed (NTP) date for acceptance. Work cannot proceed without an accepted APP. The Contracting Officer reviews and comments on the Contractor's submitted APP and accepts it when it meets the requirements of the contract provisions. Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any unforeseen hazard become evident during the performance of work, the project superintendent shall inform the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard on-site personnel, visitors, the public, and the environment. Copies of the accepted plan will be maintained at the Resident Area Office and at the job site. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.8.1 EM 385-1-1 Contents

In addition to the requirements outlines in Appendix A of USACE EM 385-1-1, the following is required:

a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used such as CSPs, CIHs, STSs, CHSTs. The duties of each position shall be specified.

b. Qualifications of competent and of qualified persons. As a minimum, competent persons shall be designated and qualifications submitted for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.

c. Confined Space Entry Plan. Develop a confined space entry plan in accordance with USACE EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, and any other Federal, State and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by

contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created).

d. Health Hazard Control Program. The Contractor shall designate a competent and qualified person to establish and oversee a Health Hazard Control Program in accordance with USACE EM 385-1-1, Section 6. The program shall ensure that employees, on-site Government representatives, and others, are not adversely exposed to chemical, physical and biological agents and that necessary controls and protective actions are instituted to ensure health.

e. Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. The plan shall be submitted 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.c.18. and the following:

(1) For lifts of personnel, the plan shall demonstrate compliance with the requirements of 29 CFR 1926, 550(g).

(2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.

f. Alcohol and Drug Abuse Plan

(1) Describe plan for random checks and testing with pre-employment screening in accordance with the DFAR Clause subpart 252.223-7004, "Drug Free Work Force."

(2) Description of the on-site prevention program.

g. Fall Protection and Prevention (FP&P) Plan. The plan shall be site specific and address all fall hazards in the work place and during different phases of construction. It shall address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 1.8 m (6 feet). A qualified person for fall protection shall prepare and sign the plan. The plan shall include fall protection and prevention systems, equipment and methods employed for every phase of work, responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Fall Protection and Prevention Plan shall be revised every six months for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. The accepted Fall Protection and Prevention Plan shall be kept and maintained at the job site for the duration of the project. The Fall Protection and Prevention Plan shall be included in the Accident Prevention Plan (APP).

h. Training Records and Requirements. List of mandatory training and certifications which are applicable to this project (e.g. explosive actuated tools, confined space entry, fall protection, crane operation, vehicle operator, forklift operators, personal protective equipment); list of requirements for periodic retraining/certification; outline requirements for supervisory and employee safety meetings.

i. Crane Work Plan. The Contractor shall provide a crane work plan to the Contracting Officer for acceptance. The crane work plan shall include the specific model of each crane and a drawing identifying their locations (exact), the dimensions, wheel sizes, number of wheels, wheel spacing, tire pressure(s), number of axles, axle spacing, minimum wheel load to be exerted during operations and maximum outrigger load to be exerted during operations. The Contractor shall allow at least 10 working days for acceptance/non-acceptance of the crane work plan. No crane operations shall begin prior to written acceptance of the crane work plan by the Government.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days after the NTP date. Format subsequent AHA as amendments to the APP. An AHA will be developed by the Contractor for every operation involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform work. The analysis must identify and evaluate hazards and outline the proposed methods and techniques for the safe completion of each phase of work. At a minimum, define activity being performed, sequence of work, specific safety and health hazards anticipated, control measures (to include personal protective equipment) to eliminate or reduce each hazard to acceptable levels, equipment to be used, inspection requirements, training requirements for all involved, and the competent person in charge of that phase of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall protection methods used. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include requirements for safeguarding excavations. An activity requiring an AHA shall not proceed until the AHA has been accepted by the Contracting Officer's Representative and a meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activity, including on-site Government representatives. The Contractor shall document meeting attendance at the preparatory, initial, and follow-up phases of quality control inspection. The AHA shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change. Activity hazard analyses shall be updated as necessary to provide an effective response to changing work conditions and activities. The on-site Superintendent, Site Safety and Health Officer and competent persons used to develop the AHAs, including updates, shall sign and date the AHAs before they are implemented.

1.10 DISPLAY OF SAFETY INFORMATION

Within 1 calendar day after commencement of work, erect a safety bulletin board at the job site. The following information shall be displayed on the safety bulletin board in clear view of the on-site construction personnel, maintained current, and protected against the elements and unauthorized removal:

a. Map denoting the route to the nearest emergency care facility.

b. Emergency phone numbers.

c. Copy of the most up-to-date APP.

d. Current AHA(s).

e. OSHA 300A Form.

f. OSHA Safety and Health Protection-On-The-Job Poster.

g. Confined space entry permit.

h. Safety and Health Warning Posters.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.13 REPORTS

1.13.1 Accident Reports

a. For recordable injuries and illnesses, and property damage accidents resulting in at least $2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 1 calendar day of the accident. The Contracting Officer will provide copies of any required or special forms.

b. For any weight handling equipment accident (including rigging gear accidents) the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the WHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Crane operations shall not proceed until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer. The Contracting Officer will provide a blank copy of the accident report form.

1.13.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $2,000, or any weight handling equipment accident. Information shall include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.13.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

1.13.4 Regulatory Citations and Violations

Contact the Contracting Officer immediately of any OSHA or other regulatory agency inspection or visit, and provide the Contracting Officer with a copy of each citation, report, and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.

1.13.5 Crane Reports

Submit crane inspection reports required in accordance with USACE EM 385-1-1, Appendix H and as specified herein with Daily Reports of Inspections.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

The Contractor shall comply with USACE EM 385-1-1, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, including but not limited to 29 CFR 1910 and 29 CFR 1926, and other related submittals and activity fire and safety regulations. The most stringent standard shall prevail.

3.1.1 Hazardous Material Use

Any work or storage involving hazardous chemicals or materials must be done in a manner that will not expose Government or Contractor employees to any unsafe or unhealthful conditions. Adequate protective measures must be taken to prevent Government or Contractor employees from being exposed to

any hazardous condition that could result from the work or storage. The Prime Contractor shall keep a complete inventory of hazardous materials brought onto the work-site. Approval by the Contracting Officer of protective measures and storage area is required prior to the start of the work.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

3.2 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and escape procedures.

3.2.1 Training

The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards. A competent person for fall protection shall provide the training. Training requirements shall be in accordance with USACE EM 385-1-1, Section 21.A.16.

3.2.2 Fall Protection Equipment

The Contractor shall enforce use of the fall protection equipment designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is on a surface 1.8 m(6 feet) or more above lower levels. Fall protection systems such as guardrails, personnel fall arrest system, safety nets, etc., are required when working within 1.8m (6 feet) of any leading edge. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.H. and 05.I. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M and USACE EM 385-1-1.

3.2.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.2.3 Safety Nets

If safety nets are used as the selected fall protection system on the project, they shall be provided at unguarded work places, leading edge work or when working over water, machinery, dangerous operations or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, fall arrest systems or restraint/positioning systems are impractical. Safety nets shall be tested immediately after installation with a drop test of 181.4 kg (400 pounds) dropped from the same elevation a person might fall, and every six months thereafter.

3.2.4 Existing Anchorage

Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person for fall protection in accordance with ANSI Z359.1. Exiting horizontal lifeline anchorages shall be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

3.2.5 Horizontal Lifelines

Horizontal lifelines shall be designed, installed, certified and used under the supervision of a qualified person for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

3.2.6 Guardrail Systems

Guardrails shall consist of top and mid-rails, post and toe boards. The top edge height of standard railing must be 42 inches plus or minus 3 inches above the walking/working level. When mid-rails are used, they must be installed at a height midway between the top edge of the guardrail system and the walking/working level. Posts shall be placed no more than 8 feet apart (29 CFR 1926.500 and USACE EM 385-1-1).

3.2.7 Rescue and Evacuation Procedures

When personal fall arrest systems are used, the Contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. A Rescue and Evacuation Plan shall be prepared by the Contractor and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. The Rescue and Evacuation Plan shall be included in the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

3.3 EQUIPMENT

3.3.1 Material Handling Equipment

a. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.

b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.

c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.3.2 Weight Handling Equipment

a. The Contractor shall notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.

b. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.

c. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.

d. The presence of Government personnel does not relieve the Contractor of an obligation to comply with all applicable safety regulations. The Government will investigate all complaints of unsafe or unhealthful working conditions received in writing from contractor employees, federal civilian employees, or military personnel.

e. Each load shall be rigged/attached independently to the hook/master-link in such a fashion that the load cannot slide or otherwise become detached. Christmas-tree lifting (multiple rigged materials) is not allowed.

f. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1, Section 11, and ASME B30.5 or ASME B30.22, as applicable.

g. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.

h. A fire extinguisher having a minimum rating of 10BC and a minimum nominal capacity of 5lb of extinguishing agent shall be available at all operator stations or crane cabs. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.

i. All employees shall be kept clear of loads about to be lifted and of suspended loads.

j. A weight handling equipment operator shall not leave his position at the controls while a load is suspended.

k. The Contractor shall use cribbing when performing lifts on outriggers.

l. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.

m. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

n. A substantial and durable rating chart containing legible letters and figures shall be provided with each crane and securely mounted onto the crane cab in a location allowing easy reading by the operator while seated in the control station.

o. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

p. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.

q. The Contractor shall certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

3.3.3 Equipment and Mechanized Equipment

a. Equipment shall be operated by designated qualified operators. Proof of qualifications shall be kept on the project site for review.

b. Manufacture specifications or owner's manual for the equipment shall be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Such additional safety precautions or requirements shall be incorporated into the AHAs.

c. Equipment and mechanized equipment shall be inspected in accordance with manufacturer's recommendations for safe operation by a competent person prior to being placed into use.

d. Daily checks or tests shall be conducted and documented on equipment and mechanized equipment by designated competent persons.

3.4 EXCAVATIONS

The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect, and document the excavations daily prior to entry by workers. The competent person must evaluate all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly.

3.5 WORK IN CONFINED SPACES

The Contractor shall comply with the requirements in Section 06.I of USACE EM 385-1-1 and OSHA 29 CFR 1910.146. Any potential for a hazard in the confined space requires a permit system to be used.

a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 06.I.06 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.

c. Ensure the use of rescue and retrieval devices in confined spaces greater than 1.5 m (5 feet) in depth. Conform to Sections 06.I.08, 06.I.09 and 06.I.10 of USACE EM 385-1-1.

d. Include training information for employees who will be involved as entrants and attendants for the work. Conform to Section 06.I.07 of USACE EM 385-1-1.

e. Daily Entry Permit. Post the permit in a conspicuous place close to the confined space entrance.

3.6 HOUSEKEEPING

3.6.1 Clean-Up

All debris in work areas shall be cleaned up daily or more frequently if necessary. Construction debris may be temporarily located in an approved location, however garbage accumulation must be removed each day.

3.6.2 Falling Object Protection

All areas must be barricaded to safeguard employees. When working overhead, barricade the area below to prevent entry by unauthorized employees. Construction warning tape and signs shall be posted so they are clearly visible from all possible access points. When employees are working overhead all tools and equipment shall be secured so that they will not fall. When using guardrail as falling object protection, all openings shall be small enough to prevent passage of potential falling objects.

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01780

CLOSEOUT SUBMITTALS

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SECTION 01780

CLOSEOUT SUBMITTALS

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-02, Shop Drawings

As-Built Drawings; G,AOF

Drawings showing final as-built conditions of the project. The drawings shall consist of two sets of completed final as-built drawings on separate media. One set of media shall be CADD drawing files. The other set of media shall consist of two sets of mylar drawings, 2 sets of blue-line prints of the mylars, and one set of the approved working as-built prints.

SD-03, Product Data

Warranty Management Plan; G,AOF

One copy of the warranty management plan containing information relevant to the warranty of materials incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives.

1.2 PROJECT RECORD DOCUMENTS

1.2.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

1.2.1.1 Working As-Built Drawings

The Contractor shall revise 2 sets of paper prints by red-line process to show the as-built conditions during the prosecution of the project. These as-built marked prints shall be kept current on a weekly basis and

available on the jobsite at all times. 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 working as-built marked prints will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working 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 the Contractor regarding the accuracy and completeness of updated drawings. The working as-built drawings shall show the following information, but not be limited thereto:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two (2) permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

b. The location and dimensions of any changes within the existing structure.

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

d. 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, etc.

e. Changes or modifications which result from the final inspection.

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

g. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.

(1) Directions in the modification for posting descriptive changes shall be followed.

(2) A modification circle shall be placed at the location of each deletion.

(3) For new details or sections which are added to the drawing, a modification circle shall be placed by the detail or section title.

(4) For minor changes, a modification circle shall be placed by the area changed on the drawing (each location).

(5) For major changes to the drawings, a modification circle shall be placed by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, a modification circle shall be placed either by the schedule heading or by the change in the schedule.

(7) The modification circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. A smaller size circle shall be used for crowded areas.

1.2.1.2 Preliminary Submittal

At the time of final inspection, the Contractor shall prepare 2 copies of the working as-built prints and these shall be delivered to the Contracting Officer for review and approval. These working 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, the working as-built marked prints will be returned to the Contractor for use in preparation of final as-built drawings. If upon review, the working as-built marked prints are found to contain errors and/or omissions, they will be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the working as-built marked prints to the Contracting Officer within 10 calendar days.

1.2.1.3 Drawing Preparation

Upon approval of the working as-built prints submittal, the Contractor will be furnished, by the Government, one set of contract drawings with all amendments incorporated, to be used for final as-built drawings. These contract drawings will be furnished as specified by the Using Agency. These drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working 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.

1.2.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of CADD drawings shall be employed to modify the contract drawings or prepare additional new drawings. 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 final as-built drawings shall be identical to that used on contract drawings. 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's system when received by the Contractor. The Using Agency uses Microstation SE CADD software system. The media files will be supplied on ISO 9660 Format CD-ROM. The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make all required corrections, changes, additions, and deletions.

a. When final revisions have been completed, each as-built drawing shall show the name of the Contractor in letters 3/16 inch high. Each drawing shall also be marked either "AS-BUILT" denoting no revisions during construction, or "REVISED AS-BUILT" denoting one or more revisions during construction. Directly under the notation shall be two signature areas, one for "SUBMITTED" by the "Chief, Design Branch" and one for "APPROVED" by the "Chief, Technical Services Division." Format of the "As-Built" or "Revised As-Built" block will be furnished the Contractor. Revisions during construction shall be listed in the revisions block, located adjacent to the signature block, with a date and denoted with modification circles to differentiate those from revisions made prior to construction.

b. After receipt by the Contractor of the approved working as-built prints and the original contract drawing files the Contractor shall, within 30 days for contracts less than $5 million and 60 days for contracts $5 million and above, make the final as-built submittal. This submittal shall consist of 2 sets of completed final as-built drawings on separate media consisting of both CADD files (compatible with the Using Agency's system on electronic storage media identical to that supplied by the Government) and mylars; 2 blue line prints of these drawings and the return of the approved marked working 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 transactions 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 final as-built drawing files and marked prints as specified 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.

1.2.1.5 Payment

Payment will be made at the contract lump sum price for "As-Built Drawings," which will constitute full compensation for all costs in conjunction with the work required in this Section.

1.3 WARRANTY MANAGEMENT

1.3.1 Warranty Management Plan

The Contractor shall develop a warranty management plan which shall contain information relevant to the clause "Warranty of Construction" in the SPECIAL CONTRACT REQUIREMENTS (Section 00800). At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. A list for each warranted feature of construction indicating:

1. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.

2. Cross-reference to warranty certificates as applicable.

3. Starting point and duration of warranty period.

4. Summary of maintenance procedures required to continue the warranty in force.

5. Organization, names and phone numbers of persons to call for warranty service.

c. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

1.3.2 Performance Bond

The Contractor's Performance Bond shall remain effective throughout the construction warranty period and warranty extensions.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.3.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this Section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.3.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements and initiate work within 3 work days and work continuously to completion or relief. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed.

1.4 FINAL CLEANING

Concrete surfaces shall be swept clean. The site shall have waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02075

REMOVALS

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SECTION 02075

REMOVALS

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 (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual

1.2 PAYMENT

1.2.1 Items a through g of Para. "GENERAL REQUIREMENTS"

All acceptably completed work included under this Section, including underwater survey, removal of specified structure items, and salvage and re-installation of stipulated items as listed in a through g of the following general requirements, will be paid for at the contract lump sum price for the payment item "Removals."

1.2.2 Item h of Para. "GENERAL REQUIREMENTS"

All acceptably completed work included under this section, including the removal of the specified obstructions as listed in Item h of the following general requirements, and necessary excavation and backfill of soils, will be paid for at the contract unit price per cubic yard for "Removal of Obstructions - 5' to 20' Depth (Maximum)."

1.3 GENERAL REQUIREMENTS

The work includes removal of stone, concrete and steel structural items, including those listed below. Also included with removal is off-site disposal, salvage of identified items and materials and installation of salvaged items. Removed materials and debris, excluding salvaged items, shall be removed from the project site daily, unless otherwise directed, to avoid accumulation at the site. In the interest of conservation, salvage of items and materials not stipulated for re-use at this site shall be pursued to the maximum extent possible. Removals shall include, but shall not be limited to, the following items and materials:

a. Entire concrete pierhead cap, approximately 9 inches to 15 inches thick, and reinforced concrete parapet wall.

b. PZ 38 steel sheet piling to the limits shown on the drawings.

c. Remove, stockpile and replace breakwater stone to pre-construction limits after placement of metal sheet piling. Furnish and install additional armor stone, as necessary to replace broken stone.

d. Miscellaneous wood and debris on armor stone breakwater adjacent to the pierhead structure.

e. Remove and dispose of steel pipe railing, also handrail at stairs.

f. Tie rods and any other metal items embedded in the concrete cap to the limits shown on the drawings.

g. Miscellaneous stone, concrete, timber, driftwood, steel, etc. - sheet pile driving line shall be cleared prior to pile driving. Stone and miscellaneous items within 5 ft. of the existing lake bottom surface elevation shall be removed and disposed of off-site. Excavation is not required if an obstruction is not within the 0 to 5 ft. depth.

h. Miscellaneous stone, concrete, timber, driftwood, steel and other debris - obstructions located from 5 ft. to 20 ft. maximum below the existing lake bottom surface shall be excavated, along with required soils, from the sheet pile driving line as necessary to install the piles within the allowed tolerance. Maximum depth of excavation, unless directed otherwise by the Contracting Officer, shall be 20 feet or bottom of crib, whichever is less. Upon obstruction removal, trench shall be backfilled with excavated soils. Miscellaneous items removed shall be disposed of off-site.

Every attempt has been made to list all removal items and materials, but others may exist. Prior to preparation of bids, the Contractor shall visit the project site and verify the above listing, and all items and materials that interfere with the proposed work, whether or not shown on the drawings, shall be removed by the Contractor at the lump sum bid price for removals.

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-01, Preconstruction Submittals

Work Plan; G,AOF

The procedures proposed for the accomplishment of the work. The procedures shall provide for safe conduct of the work; performance of underwater survey; control of removed materials; removal and disposition of materials; careful removal, stockpiling and replacement of breakwater stone; placement of new armor stone; protection of structure and features which are to remain

undisturbed and coordination with other work in progress. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations. No work shall commence until the Contractor has received the Contracting Officer's approval in writing.

Disposal of Concrete, Debris and Wastewater

Location of disposal site and written consent of property owner for disposal of the various materials at the site.

1.5 USE OF EXPLOSIVES

Use of explosives will not be permitted.

1.6 PROTECTION OF EXISTING STRUCTURE AND WATERCOURSE

Before beginning any removal work, the Contractor shall carefully survey the site and pier structure and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to avoid damage to existing pier structure and appurtenances to remain and collection of removed concrete and debris prior to entering adjacent watercourse. Any damage, other than contracted work, to pier structure and adjacent areas disturbed by the Contractor's operations shall be repaired as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall coordinate the work of this Section with all other work and shall maintain approved debris control as required. The existing pierhead structure shall not be overloaded in the performance of the work and methods of accomplishing the work to ensure this shall be included in the Contractor's "Work Plan."

1.6.1 Underwater Survey

Prior to start of construction, the Contractor shall perform an underwater survey of the pierhead structure to determine amount of damage to the sheet pile and wood crib portions of the structure. The survey shall extend from one face of the breakwater to the opposite side of the breakwater adjacent to the pierhead. Survey shall be documented by the use of Contractor-furnished photographs and videotapes. Videotapes shall be VHS format and photographs shall be 35 mm color, 4 inch by 6 inch in size. The Contractor shall provide one copy of the videotape and photos with negatives to the Contracting Officer. All work shall be performed in accordance with EM 385-1-1, Section 30 and the approved "Work Plan."

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Removal of concrete shall be done with care to avoid damage to adjacent structure and concrete not to be repaired under this contract. Reinforcement and other embedded items exposed during the concrete removal operations shall, unless otherwise directed, indicated on the drawings, or specified, be cut off flush at the breakout depth. Metal and other

miscellaneous items not indicated to be removed, which are encountered in the performance of the work under this contract shall not be removed without authorization of the Contracting Officer. Metal surfaces against which concrete is to be placed shall be wire brushed and cleaned to remove rust, grease and other materials which would prevent proper bond with the concrete. The Contractor shall conform with the applicable sections of EM 385-1-1 while performing the work specified in this Section.

3.2 REMOVAL OF METAL ITEMS

Miscellaneous metal items on the pierhead shall be removed to the extent shown on the drawings or required to perform the work under this contract.

3.2.1 Disposal

All removed metal items shall become the property of the Contractor and shall be removed from the site by the Contractor at his expense.

3.3 REMOVAL OF CONCRETE

Concrete shall be removed to the depths indicated or as directed by the Contracting Officer, in order to reconstruct the pierhead structure as shown on the drawings. Required removal may be achieved using tools specified in paragraph "Power Tools." All edges of concrete removal adjacent to existing remaining surface concrete, except where the edge of a repair area occurs at a joint, shall be saw cut a minimum depth of two (2) inches, unless otherwise noted. Broken concrete and debris shall not be permitted to enter adjacent watercourse. Blasting will not be permitted for removal of concrete.

3.3.1 Removal Tools

3.3.1.1 Power Tools

For concrete removal, the Contractor may use drilling or coring equipment, or air or hydraulic-driven chipping hammers. Boom or vehicle mounted or otherwise heavy-duty pavement impact breakers and boom or vehicle-mounted rotary equipment such as rock saws and mining machines will be permitted subject to approval by the Contracting Officer. Drop balls will not be permitted. Adequate safety measures shall be provided to protect workers, equipment, and structure in the vicinity of the work. Precautions shall be taken to prevent chipping hammers and chisels from vibrating on reinforcing steel. All equipment shall be subject to the review and approval of the Contracting Officer.

3.3.2 Control of Removed Concrete and Debris

No construction debris will be allowed to drop to the bottom of the adjacent watercourse. Concrete and debris from removal operations for top of pierhead shall be collected and retained either on top of the pierhead or next to pierhead side walls above water level. The Contractor's written method of debris control and removal must meet the approval of the Contracting Officer.

3.3.3 Disposal of Concrete, Debris and Wastewater

All broken concrete and other debris shall be disposed of in a disposal area to be obtained and arranged for by the Contractor. The Contractor shall obtain written consent of the owner of the property on which disposal will be made and shall furnish evidence thereof to the Contracting Officer. The method used for disposing of wastewater employed in cutting, mixing, and placing of concrete shall be such that the wastewater does not damage the environment of the project area. Method of disposal shall be subject to approval.

3.4 HANDLING OF BREAKWATER STONE

3.4.1 General

Breakwater stone next to the pierhead shall be temporarily removed and stockpiled to perform the sheet pile installation operations. Care shall be exercised in this removal and replacement to avoid cracking of stone and damage to pierhead structure. Removed stone may be stockpiled on the top of the remaining breakwater or at an alternate location meeting the approval of the Contracting Officer. A minimum amount of stone from the crest of adjacent stone protection shall be removed and re-built upon completion of the pierhead repair. The Contractor shall be responsible for any damage to the breakwater if caused by his stockpiling operations and repairs shall be at his expense.

3.4.2 Underlayer Stone Replacement

Stone shall be placed to a full zone thickness in one operation in a manner to avoid displacing the underlying material or placing undue impact force on underlying materials and supporting subsoils. The underlayer stone shall be placed in a manner to produce a resultant graded mass of stone with minimum voids. Rearranging of individual stones may be required to achieve this result. Placement by any method which is likely to cause segregation of the various sizes will not be permitted. Unsegregated stone shall be lowered in a bucket or container and placed in a systematic manner directly on the underlying material. Placement shall begin at the bottom of the slope and proceed upward. Casting or dropping of stone over two (2) feet or moving by drifting and manipulating down the slope will not be permitted. Final finish of the slope shall be performed as the material is placed.

3.4.3 Armor Stone Placement and Replacement

All armor stone shall be replaced individually in the breakwater in a manner to avoid displacing underlying materials, placing undue impact force on underlying material and to minimize breaking of stones. Deteriated broken stone may be re-used in structure as underlayer stone. Equipment proposed for use shall be capable of placing the stone near its final position before release and capable of moving the stone if necessary to its final position. Dragline buckets and skips shall not be used for placement of stone. Casting or dropping of stone over one (1) foot or moving by drifting will not be permitted. Adjacent stones shall be set in contact with each other so that interstices between adjacent stones shall be as

small as the character of the stone will permit. The face of stone having the largest area shall be placed against the surface of the underlying stone. Each stone shall be butted against the adjacent stone. Stone shall be randomly selected and set in as close contact as possible. The finished work shall be a well distributed mass, free of pockets of either smaller or larger stone having a minimum of voids and a maximum of interlocking of stones. All stone when placed shall be stable, keyed and interlocked with no overhanging or perched stones. It should be anticipated that rehandling of individual stones after initial placement will be required to achieve the above requirements. Final shaping of the crest shall be performed concurrently with the initial placement of stones. Stone shall be replaced to the original limits of protection that existed prior to pierhead repair.

3.5 CUTTING-OFF SHEET PILING

Tops of existing pilings shall be cut by burning or other approved method to the limits shown on the drawings. All cutting shall be done in a neat and workmanlike manner. Piling cut-offs shall become the property of the Contractor.

-- End of Section --

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02464

METAL SHEET PILING

SECTION 02464

METAL SHEET PILING

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM A 6/A 6M	(2002b) General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM A 572/A 572M	(2001) High-Strength Low-Alloy Columbium-Vanadium Structural Steel

1.2 UNIT PRICES

1.2.1 Steel Sheet Piling, Types "A", "B", "C", "D" and "E"

1.2.1.1 Payment

Payment for sheet piling quantities will be made at the applicable contract price per linear foot for furnished and installed sheet piling. Payment shall cover all cost of furnishing, handling, storing and installing piling including placing, driving, cutting holes, attaching cover plates (if applicable) and other materials and work incident thereto.

1.2.1.2 Measurement

The length of sheet piling installed, or removed, will be measured to the nearest tenth of a linear foot. For installed pilings directed to be cut off before reaching the penetration depth shown, the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut-off.

1.2.1.3 Unit of Measure

Unit of measure: linear foot.

1.2.2 Steel Sheet Piling - Fabricated Sections, Types "1" & "2"

1.2.2.1 Payment

Payment for sheet piling quantities will be made at the applicable contract price per linear foot for furnished and installed fabricated sheet piling. Payment shall cover all cost of furnishing, handling, storing and installing piling including placing, driving, cutting holes and other materials and work incident thereto.

1.2.2.2 Measurement

The length of fabricated sheet piling installed, or removed, will be measured to the nearest tenth of a linear foot. For installed pilings directed to be cut off before reaching the penetration depth shown, the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut-off.

1.2.2.3 Unit of Measure

Unit of measure: linear foot.

1.2.3 Cut-Offs

1.2.3.1 Payment

When pilings which have not been driven to penetration depths shown are directed to be cut off except for cut-offs due to excessive battering, a lump sum payment will be made for cutting off each piling.

1.2.3.2 Measurement

An additional sum will be paid for each linear foot of the portion cut off and measured for payment. For installed pilings directed to be cut off before reaching the penetration depth shown, the portion cut off will be measured for payment as the difference between the total length of piling shown on the plans for that location and the length of piling installed below the point of cut-off at the rate of 50 percent of the applicable contract unit price.

1.2.3.3 Unit of Measure

Unit of measure: each.

1.2.4 Splices

1.2.4.1 Payment

Payment will be made for each piling spliced at the direction of the Contracting Officer to drive the piling to a depth greater than shown and extend it up to the required top elevation. An additional sum will be paid for each linear foot of the piling extension at the applicable contract unit price.

1.2.4.2 Measurement

Splices will be measured for payment for each piling spliced.

1.2.4.3 Unit of Measure

Unit of measure: each.

1.2.5 Pulled Pilings

1.2.5.1 Payment

The Contractor furnished pilings which have been installed and 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 furnishing and installing the pilings in their initial position plus an equal amount for the cost of pulling.

1.2.5.2 Measurement

When such pulled pilings are redriven, an additional amount equal to 50 percent of the applicable contract unit price for furnishing and driving the pilings will be paid for redriving the pilings. This additional price constitutes payment for redriving only. The cost of furnishing, initial driving, and pulling the pilings is to be paid for as specified.

a. When pilings are pulled and found to be damaged no payment will be made for the initial furnishing and driving or for the pulling of such pilings. Pilings replacing damaged pilings will be paid for at the applicable contract unit prices.

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

Pile Driving Work Plan

The Contractor shall submit a pile driving plan to the Contracting Officer for approval prior to commencing any driving. The plan shall show the location(s) where pile driving shall start and the direction in which piles shall be driven from that location(s). Any additional fabricated piles required due to a pile driving plan other than the ones assumed on the drawings shall be furnished and installed at the Contractor's expense. Furthermore, if fabricated piles require dimensions different than shown on the contract drawings, they shall be provided at no charge in the contract unit price per linear foot for the various types.

SD-02, Shop Drawings

Metal Sheet Piling; G,TSD

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

Driving

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

SD-03, Product Data

Pile Driving Equipment; G,AOF

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

SD-05, Design Data

Pile Properties, Layouts & Calculations; G,TSD

If the Contractor elects to provide another type of metal sheet piling, either hot-rolled or cold-formed, instead of the cold-formed sections shown on the drawings for design and layout, the Contractor shall submit material and section properties which demonstrate that the alternative metal sheet piling type will provide a sheet pile wall of equivalent strength and stiffness. The Contractor shall provide tie rod spacing and layouts appropriate for the selected sections. Calculations for tie rods, wales, and appurtenances shall be provided by the Contractor if the proposed tie rod spacing for the selected sections is different from that shown on the drawings.

SD-06, Test Reports

Materials Tests

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

1.4 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities. Sheet piling over 75 feet in length shall be handled using a minimum of two pickup points.

1.5 SUBSURFACE DATA

Subsurface soil data logs are listed in Section 00100 as an attachment. Additional information on subsurface material conditions is available for examination through the Coastal/Geotechnical Section, Department of the Army, U.S. Army Engineer District, Buffalo, 1776 Niagara Street, Buffalo, New York 14207-3199.

PART 2 PRODUCTS

2.1 METAL SHEET PILING

Metal sheet piling shall be of the types specified herein and shown on the drawings. Piling shall have a nominal web thickness not less than that shown in table below. The interlocks of sheet piling shall be free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed. Sheet piling, including special fabricated sections, shall be full-length sections of the dimensions shown. Fabricated sections shall conform to the requirements of the piling manufacturer's recommendations for fabricated sections. Sheet piling shall be provided with standard pulling holes. Metalwork fabrication for sheet piling shall be as specified in Section 05501, "METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS." Piling shall meet the required properties listed in the following table:

PROPERTIES

Type	Minimum Nominal Thickness (In.)	Min. Section Modulus Per Lin. Ft. of Wall ($In.^3$)	Min. Moment of Inertia Per Lin. Ft. of Wall ($In.^4$)	Material Reference
A	0.433	40.92	273.9	ASTM A 572/A 572M Grade 50
B (B2 Corner Pile)	0.433	40.92	273.9	ASTM A 572/A 572M Grade 50
C (B3 Corner Pile)	0.433	40.92	273.9	ASTM A 572/A 572M Grade 50
D (A Corner Pile)	0.375	34.82	232.8	ASTM A 572/A 572M Grade 50
E (B Corner Pile)	0.375	34.82	232.8	ASTM A 572/A 572M Grade 50

2.1.1 Alternative Steel Sheet Pile Sections

This project was designed and the layout was developed utilizing type CZ 148 cold-formed steel sheet piling. Detailed and designated on the drawings is this type of cold-formed sheet pile section. Type CZ148 piling meets the requirements of Types "A", "B" and "C" listed in table above. At the Contractor's option, the Contractor may provide alternative steel sheet piling sections, either hot-rolled or cold-formed instead of the sections shown on the drawings and indicated in the specifications, provided the design of required sheet pile wall fulfills the requirements of SD-05, Design Data; Pile Properties, Layouts & Calculations, and is approved by the Contracting Officer. Design and complete layout for alternative sheet pile shall be performed by a Registered Structural Engineer and is the complete responsibility of the Contractor. Construction of the steel sheet pile walls with the selected alternative section, including all related adjustments to the structure components to adapt them to the selected sheet piling, shall be provided at no additional cost to the Government.

2.2 APPURTENANT METAL MATERIALS

Metal plates, bars, shapes, bolts, nuts, rivets and other appurtenant fabrication and installation materials shall conform to manufacturer's standards and to the requirements specified in the respective sheet piling standards and in Section 05502, "METAL MATERIALS, STANDARD ARTICLES, AND SHOP FABRICATED ITEMS."

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified and in Section 05501, "METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS."

2.3.1 Materials Tests

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

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment

Pile driving equipment shall conform to the following requirements.

3.1.1.1 Driving Hammers

Hammers shall be steam, air, or diesel drop, single-acting, double-acting, differential-acting, or vibratory type. The driving energy of the hammers shall be as recommended by the manufacturer for the piling weights and subsurface materials to be encountered.

3.1.2 Placing and Driving

3.1.2.1 Placing

Any excavation and temporary removal of stone required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary wales, templates, or guide structures shall be provided to insure that the pilings are placed and driven to the correct alignment. At least two templates shall be used in placing each piling and the maximum spacing of templates shall not exceed 20 feet. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.

3.1.2.2 Driving

Prior to driving pilings in water a horizontal line shall be painted on both sides of each piling at a fixed distance from the bottom so that it shall be visible above the water line after installation. This line shall indicate the profile of the bottom elevation of installed pilings and potential problem areas can be identified by abrupt changes in its

elevation. Pilings shall be driven with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths. Driving hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. Caution shall be taken in the sustained use of vibratory hammers when a hard driving condition is encountered to avoid interlock-melt or damages. The use of vibratory hammers should be discontinued and impact hammers employed when the penetration rate due to vibratory loading is one foot or less per minute. A protecting cap shall be employed in driving when using impact hammers to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced at the Contractor's expense. Pilings shall be driven without the aid of a water jet. Adequate precautions shall be taken to insure that pilings are driven plumb. If, at any time, the forward or leading edge of the piling wall is found to be out-of-plumb in the plane of the wall the piling being driven shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of-plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1/8 inch per foot of length. The horizontal alignment of the metal sheet pile wall shall be within two (2) inches of the required location after completion of driving/placing.and after assembly and attachment to wales. Pilings in each run or continuous length of piling wall shall be driven alternately in increments of depth to the required depth or elevation. No piling shall be driven to a lower elevation than those behind it in the same run except when the pilings behind it cannot be driven deeper. If the piling next to the one being driven tends to follow below final elevation, it may be pinned to the next adjacent piling. If obstructions restrict driving a piling to the specified penetration the obstructions shall be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed to insure the adequacy and stability of the structure. Pilings shall be driven to depths shown and shall extend up to the elevation indicated for the top of pilings. A tolerance of one-half (1/2) inch above the indicated top elevation will be permitted. Pilings shall not be driven within 100 feet of concrete less than 7 days old.

3.1.3 Cutting-Off and Splicing

Pilings driven to refusal (hard driving in excess of 10 blows per inch with an impact hammer and pile penetration rate of less than one (1) foot per minute for a period of 15 minutes for vibratory hammers) or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation. Pilings driven below the required top elevation, with no direction by the Contracting Officer, and pilings damaged by driving and cut off to permit further driving shall be extended as required to reach the top elevation by splicing when directed at no additional cost to the Government. Pilings adjoining spliced pilings shall be full length unless otherwise approved. Splicing of pilings shall be as indicated. Ends of pilings to be spliced shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no

discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. The tops of pilings excessively battered during driving shall be trimmed when directed at no cost to the Government. Piling cut-offs shall become the property of the Contractor and shall be removed from the site. The Contractor shall cut holes in pilings for bolts, rods, drains or utilities as shown or as directed. All cutting shall be done in a neat and workmanlike manner. A straight edge shall be used in cuts made by burning to avoid abrupt nicks. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods which will not damage the surrounding metal. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted.

3.1.4 Inspection of Driven Piling

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

3.1.5 Pulling and Redriving

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

3.2 QUANTITIES

The estimated quantities of sheet piling listed in the unit price schedule of the contract as to be furnished by the Contractor are given for bidding purposes only. Sheet piling quantities for payment shall consist of the linear feet of piling acceptably installed or removed. Installed quantities shall consist of all piling, including fabricated sections, driven or installed between the required top and bottom elevations of pilings plus any additions thereto resulting from changes in design or alignment as provided in paragraph "Driving." Removed quantities shall consist of the lengths of piling pulled from below the ground level.

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02485

GRANULAR FILL MATERIALS

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SECTION 02485

GRANULAR FILL MATERIALS

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.

ASTM INTERNATIONAL (ASTM)

ASTM C 127	(2001) Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 295	(2003) Petrographic Examination of Aggregates for Concrete
ASTM C 535	(2003el) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 653	(2003) Standard Terminology Relating to Soil, Rock, and Contained Fluids

U.S. ARMY CORPS OF ENGINEERS (USACE)

CRD-C 144	(1992) Standard Test Method for Resistance of Rock to Freezing and Thawing
CRD-C 148	(1969) Method of Testing Stone for Expansive Breakdown on Soaking in Ethylene Glycol
RTH 102	(1993) Recommended Practice for Petrographic Examination of Rock Cores
RTH 103	(1993) Preparation of Test Specimens
RTH 107	(1993) Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate
RTH 108	(1993) Method of Determining Density of Solids

OHIO DEPARTMENT OF TRANSPORTATION (ODOT)

ODOT 703	(2002) Aggregate

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(2003) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

1.2 MEASUREMENT

New stone materials will be measured for payment by the ton (2,000 pounds) of material acceptably placed in the work as determined by carrier displacement or certified scale weight tickets, as approved by the Contracting Officer. Material placed beyond the tolerance limits will not be paid for. Reduction of materials placed beyond tolerance limits will be made based on the use of factors outlined in paragraph "Conversion Factors." Any material wasted or used by the Contractor for other purposes and any material not placed in the required work in accordance with the requirements of the specifications and drawings will not be measured or paid for.

1.2.1 Method of Determining Weight with Delivery by Vessel or Barge

1.2.1.1 Gauges

If stone is delivered by vessel or barge, the carrier shall, prior to use in connection with this work, be fitted by the Contractor at its own expense with gauges or such other facilities for determining displacement as may be required by, or be satisfactory to, the Contracting Officer. Carriers, which owing to their model or other cause cannot be accurately gauged for displacement, shall not be used on this work. Gauges shall be graduated to the tenth of a foot, or to other suitable unit approved by the Contracting Officer. They shall be six (6) in number and shall be located as follows: two (2) near each end on opposite sides and two (2) amidship on opposite sides. The gauges shall be attached solidly to the hull itself, and wherever practicable, shall be located inside the hull. If located inside the hull, provisions shall be made for the free passage of the outside water to a vertical tube and for the ready measurement of the depth of the water within the tube. If located outside on wood hulls, the gauges shall be protected by solid fenders or be recessed into the planking, or if on steel hulls, the gauge marks may be placed directly on the plates and identified by punch marks. Gauges shall be so placed that their zeros are below water when the carrier is in its normal trim, light and free from water. The installation of the gauges shall be subject to the approval of the Contracting Officer. The Contracting Officer shall be allowed to be present at the installation of gauges and (s)he shall be notified a minimum of five (5) days prior to installation of gauges.

1.2.1.2 Gauging Tables

To facilitate the determination of the weight of each load, a gauging table for each carrier employed shall be prepared by an accredited agent satisfactory to the Contracting Officer. The gauging table shall show the

cargo weight, in tons of 2,000 pounds, for each unit of measurement of the draft. If the lines of the carrier are such that the cubic feet of displacement for each measured unit of draft can be accurately calculated, the gauging table shall be based upon the data, using 62.4 pounds as the weight of one (1) cubic foot of water. If the lines of the carrier to be gauged are such as to render impracticable the preparation of the gauging table by the above described method, the weight for each unit of draft shall be determined by measurement of displacement by actually loading stone of known weight and the weight thus obtained shall be entered in the table for use in subsequent gauging. If alterations are made in any carrier which will affect the accuracy of the gauging table, after it has been prepared, or if otherwise deemed necessary at any time by the Contracting Officer, the carrier shall be remeasured, and a new gauging table prepared. The Contractor shall furnish such labor and material as may be required in collecting data for the preparation of gauging tables, and the cost of the labor and material so furnished shall be included in the contract unit price per ton for the items as applicable. Existing stone placed in lieu of new stone is excluded from measurement for payment for new stone.

1.2.1.3 Reading of Draft Gauges

Readings to determine the draft will be taken before and after unloading. The difference in tonnage found between loaded and light, will be used to determine the net weight to be paid. The draft shall be determined from the average of all six (6) readings, weighting the readings of the middle gauges at double those of the end gauges. (G1 + G2 + 2xG3 + 2xG4 + G5 + G6) divided by 8 = average draft. The Contracting Officer shall be present at all draft gauge readings.

1.2.1.4 Uniform Loading

The carrier shall be so loaded as to cause uniform submergence. The increase in draft on the middle gauges, as a result of the load, shall not differ by more than 0.5 feet from each other and that between any bow gauges and any stern gauges shall not differ more than 1.5 feet from each other. If such is not the case, the Contractor shall trim the carrier by shifting the stone until this limit is reached, before the stone will be accepted. If, however, the carriers proposed to be used by the Contractor are so built that they cannot be loaded as prescribed, and yet can be calibrated accurately for displacement under varying loads, such other method of determination of displacement as may be approved by the Contracting Officer may be used.

1.2.1.5 Readings in Still Water

All measurements for determining gauging table data and for load depths shall be made in still water as close to the work as is possible. The Contractor is required to place the carriers where such measurements can be accurately made.

1.2.1.6 Leaks

All carriers used in transporting stone shall be free of leaks such as would render accurate gauging difficult. Facilities for inspecting the hold of each carrier to determine whether leakage is occurring shall be

provided. Each carrier shall also be provided with adequate pumping facilities, and if water is found to be accumulating in the hold, the carrier shall be pumped dry before each gauging, both before and after unloading.

1.2.1.7 Variations During Unloading Operations

Lightening by pumping or by transfer of crews or supplies will not be permitted while stone is being discharged. Should any lightening become necessary, the unloading of stone shall be suspended and the draft readings taken before and after lightening, or, upon approval of the Contracting Officer's on-site representative, other record made of the amount removed. The amount determined by the Contracting Officer, as having been removed shall be excluded from the net tonnage paid.

1.2.1.8 Carrier Designations

Each carrier shall be plainly marked by a distinctive number, letter, or name, which shall not be changed or given to any other carrier during the contract period.

1.2.1.9 Verification of Measurements

The readings, other data, and calculations from which the gauging table and the tonnage are determined will be open to verification by the Contractor and shall be subject to the approval of the Contracting Officer. The Contractor is invited to be present in person or to be represented by an authorized agent during the measuring of carriers. When the displacements of the carriers are determined or redetermined, a record of allowed displacement for quantity determination will be sent to the Contractor. If the Contractor protests within five (5) days, the carrier will be remeasured and the Contractor must be present in person or be represented by an accredited agent so that correct measurements can be agreed upon. The Contractor will be given the weight of each load, as it is determined. Failure to protest within five (5) days will be taken as equivalent to expressing satisfaction with the measurements and weight of stone determined by the Contracting Officer.

1.2.1.10 Carriers Not Measured

In case any stone is delivered by carriers not measured for displacement and marked as herein described, the Contractor shall, with the Contracting Officer's approval and at the Contractor's expense, furnish means for properly and conveniently weighing such stone at the work site.

1.2.2 Method of Determining Weight with Delivery by Truck

The method of measurement for determining the weight of stone materials delivered by truck shall be certified weigh bills provided by the Contractor at the job site from either on-site or off-site scales. Weigh bills and the scales used for weighing of trucks and materials contained therein shall, unless otherwise approved by the Contracting Officer, conform to the following requirements:

a. Scales shall conform to the requirements of the National Bureau of Standards (NBS) Handbook NIST HB 44. The tolerance applications of the Handbook, as applicable to under registration and over registration and to tests involving digital indications or representations, shall apply. The manufacturer shall not use a scale for weighing a load totaling more than the nominal capacity marked on the scale. Any portion of the load in excess of the nominal scale capacity will not be considered for payment.

(1) The accuracy of the scale shall be checked. When a State scale inspector is not immediately available for checking the scale, the Contractor may, at its own expense, secure a check from a local official sealer of weights and measures, or the Contracting Officer, may give tentative approval, based on check truckloads weighed on other scales which bear an official seal placed in the current calendar year.

b. The total weight of a single highway vehicle shall be weighed as a single draft and shall not be determined by adding together the results obtained by separately weighing each end of such vehicle, except that weighing of a coupled combination may be determined without uncoupling under the following conditions:

(1) The brakes are released.

(2) There is no tension or compression on the drawbar.

(3) The approaches are straight and in the same level plane as the scale platform.

(4) The approaches are paved at least fifty (50) feet in each direction with a seal coat or higher type surfacing.

(5) The approaches are of sufficient width and length to ensure level positioning of vehicles during the weighing operation.

c. When a printout system is employed on a platform or surge bin scale, it shall be equipped with a printer, which shall print the following information on a triplicate ticket for each truckload:

(1) Time.

(2) Date.

(3) Sequential ticket number (may be preprinted on ticket).

(4) Gross Weight.

(5) Tare Weight (trucks shall be tare weighed at least twice daily).

(6) Net Weight.

(7) Net accumulated job daily total.

(8) Truck identification number (or license plate number).

d. The system shall be so interlocked as to allow printing only when the scale has come to a complete rest.

1.2.2.1 Scales

For scales not equipped with the print-out system, as stated above, weigh bills shall contain the same or equivalent data as specified for the print-out system. Weigh bills, including printouts, shall be certified by the signature of the scale operator, which shall attest that the information shown on the weigh bill is correct and is the weight(s) observed on the scale at the time of weighing. Each weigh bill shall also be certified by the Contractor attesting that the entire load was properly placed in the work, and shall show the time and date of weighing and the time and date of unloading. Each truck shall be plainly marked by a distinctive number, letter, or name, which shall not be changed or given to any other truck during the contract period. The Government reserves the right to periodically inspect the weighing operations at the scales. Copies of waybills and delivery tickets shall be submitted during the progress of the work with the Contractor's daily Quality Control Reports. Before the final statement is allowed, the Contractor shall file certified waybills and certified delivery tickets for all stone actually used.

1.2.2.2 On-Site Scales

On-site scales shall be certified by the applicable local weights and measures regulating agency and shall be as approved by the Contracting Officer. Scales shall be of the recording type and of the size required to weigh the materials and containers or vehicles. The scale shall include housing for the instruments and scale operator, with heat, lighting and ventilation.

1.2.3 Determination of Excess Stone

All stone permitted by the Contracting Officer to remain outside the limits and tolerances of the cross sections of the structure, except variations so minor as not to be measurable, will be deducted from the quantity of new stone to be paid for. Weight of excess stone will be determined from the cross sections obtained by the method provided for in paragraph "Final Surveys," on the basis that the cubic feet of volume (including voids) for each type of stone listed in paragraph "Conversion Factors", is equal to one (1) ton or 2,000 pounds for the bulk specific gravity and percentage of voids shown. Should any excess stone be disclosed above the tolerance line, its volume will be computed by the average end area method, based on the cross sections in the following manner. The average end area of excess stone above the tolerance line for two (2) successive cross sections, multiplied by the distance between the cross sections will be accepted as the volume. The Contractor will not be required to remove such excess stone and deductions for the weights thereof will be made from contract payments for new stone. In addition to the above, stone which has been delivered to the site and has been lost or wasted or otherwise not properly incorporated into the final required work, shall be deducted from the quantity to be paid for.

1.2.4 Final Surveys

Survey work and measurements required for determination of excess volume computations for stone materials shall be performed by the Contractor in the presence of the Government's on-site representative, unless the requirement for the Government's presence is waived. Cross section surveys shall be taken perpendicular to the axis of the structures. Elevations and soundings shall be taken on lines fifty (50) feet apart measured along the structure reference line, with readings at five (5) foot intervals and at breaks in the grade along the line. Other survey intervals and readings may be used if deemed appropriate or advisable by the Government's on-site representative. Additional cross sections, elevations and soundings may be taken if determined necessary by the Government's on-site representative. Any required plotting of cross-sections and volume computations will be done by the Government and determination of quantities will be made by the Government's on-site representative and having once been made, will not be reopened, except on evidence of collusion, fraud or obvious error. Prior to performing any work under this Section, the Contractor shall coordinate all operations with the Government's on-site representative so that excess volume surveys will be made at the appropriate time. Stone quantity computations shall be based entirely upon weights of new stone as determined from carrier displacement or certified scale weight tickets. Existing stone placed in lieu of new stone from off-site sources is excluded from measurement for payment.

1.2.5 Conversion Factors

The following factors, based on a specific weight of water of 62.4 pounds per cubic foot, were used in converting the in-place volume to the quantities shown in Section 00010, "SOLICITATION, OFFER AND AWARD (SF 1442) AND BIDDING SCHEDULE."

Stone	Specific Gravity	Percent Voids
Granular Fill & Select Fill	2.65	33%

1.2.5.1 Adjustment of Bid Quantities After Award

If the specific gravities of any stone material proposed for use by the Contractor are different by more than plus or minus five (5) percent from the design specific gravity of 2.65 (165 pcf), then the quantities shown in the bid schedule shall be recomputed based on the actual specific gravity of the stone used on the project. Unit prices will not be affected. Contract Clause (Section 00700) paragraph entitled "VARIATION IN ESTIMATED QUANTITY" shall not apply until after the quantities have been adjusted.

1.3 PAYMENT

Payment for stone material will be made at the contract unit price per ton in place for "Granular Fill Material" and "Select Fill Material," which shall include all costs of furnishing all plant, labor, and materials, and performing all operations required to complete the work as specified herein, and as shown on the drawings. All stone material shall be new quarried material.

1.4 DESCRIPTION

The work specified herein consists of the filling and compacting between sheet pile walls with granular fill and select fill material as specified herein and as shown on the drawings.

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

Quality Control Plan; G,AOF

Prior to placement of any materials, the Contractor shall submit in writing, the detailed methods proposed for testing and include processing, loading and handling each test sample and notifying the Contracting Officer when any production method is changed.

Quarry Operations and Handling

The Contracting Officer shall be advised in writing of quarrying, processing, handling, and loading methods proposed prior to the start of work and when changes are made to these operations during the contract period. The information shall be submitted in a complete, clear manner.

Construction Equipment; G,AOF

The Contractor shall submit catalog cuts, brochures, or other descriptive literature describing the equipment to be used to place, compact and consolidate granular fill and select fill material, above and below water.

SD-04, Samples

Material Sampling and Shipping; G,TSD

Samples of stone for quality testing when directed by the Contracting Officer.

Evaluation Testing; G,TSD

Test samples, if requested by the Contracting Officer, shall be obtained by and at the expense of the Contractor and under the supervision of a representative of the Contracting Officer.

1.6 LISTED SOURCES

All stone shall be produced from the sources listed in the SPECIAL CONTRACT REQUIREMENTS (Section 00800) paragraph entitled "LISTED STONE SOURCES," or from a non-listed source when approved in accordance with the conditions of the contract. All listed sources have been evaluated for this project by the U.S. Army Corps of Engineers, Buffalo District, and found suitable for listing in our specifications. Listed sources have been placed into two categories, "Category I" and "Category II." Sources are listed under a category of quality for each type of stone listed. Following is a description of each category.

a. Category I. Category I sources have recently been inspected for this particular project and have previously demonstrated effective quality control programs and sound service record histories. The Category I listed sources have been recently geologically inspected and found suitable and test results reflect this. Additionally, the Category I sources have previously passed all pre-qualification criteria and unless there is a cause for concern, these sources will only require a final Government inspection before approval for use.

b. Category II. Category II listed sources have suitable quarry material, but these sources lack one or more of the criteria needed to be classified as a Category I source. Category II sources may lack effective quality control, rock quality, test data or service record histories. Category II listed sources only indicate a possibility that if selected areas, appropriate quarrying techniques and knowledgeable quality control personnel are utilized, they have potential for producing the stone specified.

Listing of a source under Category I or Category II does not guarantee that the quality and/or sufficient quantities of material required for this project are available. No stone will be considered acceptable until a determination is made by the Contracting Officer at the project site.

1.7 ALTERNATE SOURCES

If it is found during the contract that acceptable materials and quantities of materials cannot be obtained by the Contractor from the source(s) and suppliers presently being used, the Contractor may request approval to use alternate source(s). If the request is approved, the source(s) to be used shall be selected first from the Category I sources, then from the Category II sources listed in the Special Contract Requirements. Obtaining and furnishing materials from the substitute source(s) shall be at no additional cost to the Government. Refer to paragraph "LISTED STONE SOURCES" of Section 00800, regarding unlisted sources.

1.8 MATERIAL SAMPLING AND SHIPPING

All stone shall be tested for quality prior to the start of placement when directed by the Contracting Officer. Additionally, if before or during the course of the quarry operations conditions are such that, in the Contracting Officer's opinion, testing to ensure the quality of the production material is warranted, the following action will be taken:

a. Test samples shall be obtained by the Contractor at his own expense. Samples selected for testing shall be representative of rock formations in the quarry to be used or being used on the project. The Contracting Officer or his designated representative must be present and approve the selection of all test samples before shipment. The Contracting Officer may personally select all samples if he so elects. Individual rock samples shall be the size of the largest stone specified, with no sample weighing more than 2,000 pounds, whichever is less. The exact number of test samples will be determined by the Contracting Officer or his representative during the pre-production quarry inspection.

b. The samples shall be prepared in accordance with RTH 103 and shall be shipped or delivered by the Contractor, at his expense, to the Rock Laboratory Director, U.S. Army Engineer Research and Development Center, Waterways Experiment Station Site, Attn: CEERD-GM-C, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, Ph: 601-634-3278. Tests performed will be as described in the following paragraph "MATERIAL TESTS."

1.9 MATERIAL TESTS

Tests to which the material may be subjected, include one or more of the following tests, and any others determined necessary to assure acceptable material. All tests shall be performed in accordance with the applicable portion of the CRD, RTH and/or ASTM tests listed in paragraph "REFERENCES," except some variations of these tests developed by the U.S. Army Engineer Research and Development Center, Waterways Experiment Station Site (CEERD) may be used if applicable to local conditions. All tests shall be made by or under the supervision of the Government and at its expense except as specified in paragraph "Field Tests."

1.9.1 Petrographic Examination

Petrographic examination may be performed in accordance with ASTM C 295 and RTH 102.

1.9.2 Specific Gravity, Absorption and Unit Weight

Specific gravity, absorption and unit weight may be determined in accordance with ASTM C 127, RTH 107 and RTH 108.

1.9.3 Resistance to Degradation

Resistance to degradation by abrasion may be determined in accordance with ASTM C 535.

1.9.4 Wetting and Drying

Expansive breakdown by wetting and drying may be performed in accordance with CRD-C 148.

1.9.5 Freezing and Thawing

Resistance to freezing and thawing may be determined in conformance with CRD-C 144.

1.10 TERMS AND SYMBOLS

Terms and symbols relating to rock shall be as listed and defined in ASTM D 653.

PART 2 PRODUCTS

2.1 GENERAL

The materials to be furnished shall meet all requirements specified in this Section of the specifications. The Contracting Officer, at any time during the contract, shall reject materials at the source or job site not meeting the specified requirements. Inspection of materials at the quarry and job site by the Contracting Officer will be as specified in paragraph "Quality Inspection at the Quarry and at the Site of Work." Inspection and testing of materials by the Contractor shall be as stated in paragraph "CONTRACTOR QUALITY CONTROL." Materials which have been delivered to the project site and are rejected, whether in stockpile or in place in the structure, shall be promptly removed from the project site at the Contractor's expense and responsibility. The Contractor shall provide samples of stone to be used in the work to the Contracting Officer as specified in paragraph "Material Sampling and Shipping" prior to delivery of any such material to the site of the work. If the Contractor selects a listed stone source, a written notification of said source shall be provided the Contracting Officer a minimum 15 days prior to scheduled delivery of material to the project site. If a stone source other than those given in the SPECIAL CONTRACT REQUIREMENTS (Section 00800) is to be used, the Contractor shall, within 10 days of the date of the Notice to Proceed, obtain and deliver test samples as stated in paragraph "Evaluation Testing." The Government reserves the right to retest any of the materials produced from the sources listed in the SPECIAL CONTRACT REQUIREMENTS.

2.1.1 Material Quality

All stone shall be of a quality to ensure permanence of the structure in the climate in which it is to be used. The stone shall be durable, sound, free from detrimental blast induced, hairline thickness cracks, seams, and other defects which tend to increase deterioration from natural causes or cause breakage during handling and/or placing. It shall be highly resistant to weathering and disintegration under freezing and thawing and wetting and drying conditions and shall not contain amorphous chert. No dirt, sand, or clay will be permitted. Acceptability of stone material will be determined by the Contracting Officer from suitable laboratory tests, visual inspection, and service records. Tests which the material may be subjected to are given in paragraph "MATERIAL TESTS." Inspection for cracks, fractures, seams, defects, and deterioration shall be made by visual examination. Service records shall be presented by the Contractor that include documentation to show the stone has performed satisfactorily in the recent past on similar structures. Inclusion of objectionable quantities of dirt, sand, clay, chert and rock fines or other deleterious

material will not be permitted. Selected limestone, dolomite, dolomitic limestone, and sandstones will generally meet the requirements of these specifications if controlled blasting and handling techniques are utilized.

2.1.2 Quarry Operations and Handling

Quarry operations shall be conducted by the Contractor/Supplier in a manner that will produce stone conforming to the requirements specified and may involve selective quarrying, handling, processing, blending, and loading as necessary. Blasting and handling of rock shall be controlled by the Contractor/Supplier to produce rock of the size ranges and quality specified. Techniques such as the use of proper hole diameter, hole depth, hole angle, burden and spacing distances, types and distribution of explosives, delay intervals and sequence, removal of muck piles between each shot, and special handling techniques will be required as necessary to produce the specified materials. All aspects of blasting operations shall be specifically designed so that the end product is not damaged from the blasting technique and that the stone is suitable for the intended purpose.

2.2 CRUSHED STONE MATERIALS

Crushed stone materials shall consist of crushed gravel or crushed stone, reasonably well graded within the prescribed limits specified below. The material shall be composed of tough, durable particles, reasonably free from thin, flat, and elongated pieces and shall contain no more than 5 percent by weight of deleterious material such as organic matter or soft, friable particles. Stones shall be predominantly angular in shape. Not more than 25 percent of the stones reasonably well distributed throughout the gradation shall have a length more than 2.5 times the breadth or thickness.

2.2.1 Granular Fill Material

The gradation shall meet the requirements of ODOT 703, Table 703.01-1, size no. 3 as shown below:

U.S. Standard Sieve Size	Percent Finer by Weight
2 1/2 inch	100
2 inch	90-100
1 1/2 inch	35-70
1 inch	0-15
1/2 inch	0-5

2.2.2 Select Fill Material

The gradation shall meet the requirements of ODOT 703, Table 703.01-1, size no. 6 as shown below:

U.S. Standard Sieve Size	Percent Finer by Weight
1 inch	100
3/4 inch	90-100
1/2 inch	20-55
3/8 inch	0-15
No. 4	0-5

PART 3 EXECUTION

3.1 FILL PROCEDURE

3.1.1 General

All material shall be placed uniformly within the lines and grades indicated on the drawings or as directed by the Contracting Officer. Material shall be placed by equipment suitable for handling materials of the size specified, and method of placement, consolidation and compaction will be subject to the approval of the Contracting Officer.

3.1.2 Filling With Granular Fill Material

Placement of granular fill material within steel sheet pile walls shall not be done until tie-rods, wales, and connections are installed, tightened, and inspected; and the structure aligned within the required tolerances.

3.1.2.1 Below Water Surface

Fill shall be carefully placed in a manner that a minimum of voids will be obtained and operations do not cause damage to the structure. When fill is placed to approximately 1 ft. above water surface, initial consolidation shall be performed. Consolidation shall be performed by vibrating steel piling through the entire depth of the granular fill and retrieving with vibratory pile driving equipment. Consolidation locations, if this method is utilized, shall be 5 ft. maximum on center or as otherwise directed by the Contracting Officer to attain maximum consolidation. This is an approved method for consolidating the specified fill material, but other methods exist. Another method that will give equivalent consolidation may be used subject to approval of the Contracting Officer and at no additional cost to the Government. Contractor's method shall be included in the "Excavation, Grading and Fill Plan" submitted for approval of the Contracting Officer.

3.1.2.2 Above Water Surface

Granular fill shall be placed on the prepared surface in 6 inch lifts prior to compacting. Compaction of each lift shall be obtained by the use of vibratory compactors, tamping rollers, trench rollers, or other suitable equipment. Type of equipment shall meet with the approval of the Contracting Officer. Each lift shall be compacted with no less than three (3) passes of the approved compaction equipment over the entire surface. Light blading during compaction may be required for the finished surface to conform to the lines, grade and cross-section. Should the surface for any reason become rough, corrugated, rutted, uneven in texture, or traffic marked prior to completion of the filling and repair, such unsatisfactory portion shall be reworked , recompacted, or replaced as directed.

3.2 TESTS

3.2.1 Evaluation Testing

The Government reserves the right to test materials from unlisted sources or retest any of the materials produced from the sources listed in the SPECIAL CONTRACT REQUIREMENTS. Should the Government require testing during the life of the contract, the following criteria shall be met: Representative samples of each stone description may be required. Retesting of materials previously approved from listed or unlisted sources will be by the Government and at Government expense. The samples will be shipped or delivered by and at the expense of the Government to the Rock Laboratory Director, U.S. Army Engineer Research and Development Center, Waterways Experiment Station Site, Attn: CEERD-GM-C, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, Ph: 601-634-3278.

3.2.2 Crushed Stone Material

Tests to which the material may be subjected are those specified in paragraph "MATERIAL TESTS," and such other tests as may be considered necessary to demonstrate to the satisfaction of the Contracting Officer that the material is acceptable for use in the work.

3.2.3 Samples for Testing

Samples for testing, as specified in paragraph "Evaluation Testing," shall be furnished in the following quantity:

Granular & Select Fill Matl.	500 pounds

3.3 CONTRACTOR QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and maintain records of his quality control for all operations performed, including, but not limited to, the following:

3.3.1 Field Tests

Field tests shall be performed by the Contractor at his expense. Samples for testing shall be selected at the project site by the Contractor. The minimum number of tests specified below shall be made at uniform intervals in proportion to the quantity of the particular material. Tests shall be made as specified below to determine compliance with paragraph "MATERIAL TESTS" above. If the materials fail to meet the requirements as specified, the Contractor shall adjust his operation as required to produce acceptable materials and shall repeat the necessary tests at the Contractor's expense. Materials that do not meet the specification requirements shall be disposed of off the project site at the Contractor's expense. The following field tests will be required as a minimum:

Material	Type of Test	Sample Size	Minimum No. of Tests
Granular Fill and Select Fill	Visual Inspection	--	
	Sieve Analysis	150 lbs. min.	2 ASTM C 136

3.3.1.1 Visual Inspection

A visual check of all materials shall be made at the project site for quality, elongation and the presence of deleterious materials.

3.3.1.2 Sieve Analysis

Test results shall be plotted on ENG Form 4056. A copy of the form is listed in Section 00100 as an attachment.

3.3.2 Quality Inspection at the Quarry and at the Site of Work

Prior to delivery of any stone materials, the Contractor's inspector shall meet with a Government representative at the quarry or quarries designated to supply stone materials at a mutually agreeable time. Representative samples of stone to be furnished shall be set aside at the quarry for inspection, and the samples shall be kept available for reference until shipping of stone to the site has been completed. After initial inspection of the samples, basic inspection of quarry material shall be provided by the Contractor as part of his Quality Control requirements.

-- End of Section --

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DIVISION 03 - CONCRETE

SECTION 03101

FORMWORK FOR CONCRETE

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SECTION 03101

FORMWORK FOR CONCRETE

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	(2001) Guide to Formwork for Concrete

ASTM INTERNATIONAL (ASTM)

ASTM C 31/C 31M	(2000el) Making and Curing Concrete Test Specimens in the Field
ASTM C 39/C 39M	(2001) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 1077	(2002) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation

U.S. DEPARTMENT OF COMMERCE (DOC)

PS1	(1995) Construction and Industrial Plywood (APA V995)

1.2 PAYMENT

No separate payment will be made for formwork and all costs in connection therewith shall be included in the contract unit or lump sum prices for the items of work to which the work is incidental.

1.3 DESIGN REQUIREMENTS

The design, engineering, and construction of the formwork shall be the responsibility of the Contractor. The formwork shall be designed for anticipated live and dead loads and shall comply with the tolerances specified in Section 03300, "CONCRETE," paragraph "CONSTRUCTION TOLERANCES." The formwork shall be designed as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. The adequacy of formwork design and construction shall be monitored prior to and during concrete placement as part of the Contractor's approved "Quality Control Plan."

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-02, Shop Drawings

Shop Drawings

Drawings and design computations for all formwork required shall be submitted at least 10 days either before fabrication on site or before delivery of prefabricated forms.

SD-03, Product Data

Materials

Manufacturer's literature shall be submitted for plywood, concrete form hard board, form accessories, prefabricated forms, and form coating.

SD-06, Test Reports

Inspection

The Contractor shall submit field inspection reports for concrete forms and embedded items.

1.5 SHOP DRAWINGS

The shop drawings and data submitted shall include the type, size, quantity, and strength of all materials of which the forms are made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Forms

Forms shall be fabricated with facing materials that will produce a finish meeting the specified irregularities in formed surface requirements as defined in ACI 347R. Forms and form liners shall be fabricated with facing materials as specified below.

2.1.1.1 Class "B" Finish

This class of finish shall apply to all formed surfaces. The form facing material shall be composed of tongue-and-groove or shiplap lumber, plywood conforming to PS1, Grade B-B concrete form, tempered concrete form hard board or steel. Steel lining on wood sheathing will not be permitted.

2.1.2 Form Coating

Form coating shall be commercial formulation that will not bond with, stain, cause deterioration, or any other damage to concrete surfaces. The coating 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. If special form liners are to be used, the Contractor shall follow the recommendation of the form coating manufacturer.

2.2 ACCESSORIES

Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 2 inches from any concrete surface either exposed to view or exposed to water. Removable tie rods shall not be allowed in any location. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Form Construction

Forms shall be constructed true to the structural design and required alignment. The form surface and joints shall be mortar tight and supported to achieve safe performance during construction, concrete placement, and form removal. The Contractor shall continuously monitor the alignment and stability of the forms during all phases to assure the finished product will meet the required surface class specified in paragraph "Forms" and tolerances specified in paragraph "DESIGN REQUIREMENTS." Failure of any supporting surface either due to surface texture, deflection or form collapse shall be the responsibility of the Contractor as will the replacement or correction of unsatisfactory surfaces. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Forms shall not be re-used if there is any evidence of defects which would impair the quality of the resulting concrete surface. All surfaces of used forms shall be cleaned of mortar and any other foreign material before reuse. Form ties that are to be completely withdrawn shall be coated with a nonstaining bond breaker.

3.1.2 Chamfering

All exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete surfaces. Chamfered joints shall be terminated twelve inches outside the limit of the earth or rockfill so that the end of the chamfers will be clearly visible.

3.1.3 Coating

Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that, in cold weather when freezing temperatures are anticipated, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

3.2 FORM REMOVAL

Forms shall not be removed without approval. The minimal time required for concrete to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them. In any case forms shall not be removed unless the minimum time, minimum ambient temperature, and minimum compressive strength requirements below are met, except as otherwise directed or specifically authorized. When conditions are such as to justify the requirement, forms will be required to remain in place for a longer period. All removal shall be accomplished in a manner which will prevent damage to the concrete and ensure the complete safety of the structure. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements. Form removal shall be scheduled so that all necessary repairs can be performed. Evidence that concrete has gained sufficient strength to permit removal of forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C 31/C 31M and ASTM C 39/C 39M at the expense of the Contractor by an independent laboratory that complies with ASTM C 1077 and shall be tested within 4 hours after removal from the site.

3.2.1 Formwork Not Supporting Weight of Concrete

Formwork for walls, columns, sides of beams, gravity structures, and other vertical type formwork not supporting the weight of concrete shall not be removed in less than 24 hours after concrete placement is completed. Form removal before 24 hours will be allowed for simple floor slab, sidewalks, and driveways provided the ambient temperature during this period has not fallen below 50 degrees F at any time since placement and evidence from compressive tests on field-cured concrete control cylinders indicates that the concrete has attained a compressive strength of at least 1,000 psi. Control cylinders shall be prepared for each set of forms to be removed before 24 hours. The stability of the concrete shall be evaluated by a structural engineer prior to removal of the forms.

3.2.2 Formwork Supporting Weight of Concrete

Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported concrete may be subjected. As a minimum, forms shall be left in place until control concrete test cylinders indicate evidence the concrete has attained at least 90 percent of the compressive strength required for the structure in accordance with the quality and location requirements of Section 03300, "CONCRETE."

3.3 INSPECTION

Forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor 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.

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DIVISION 03 - CONCRETE

SECTION 03150

EXPANSION JOINTS IN CONCRETE

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SECTION 03150

EXPANSION JOINTS IN CONCRETE

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.

ASTM INTERNATIONAL (ASTM)

ASTM C 920	(2002) 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 1996el) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

1.2 PAYMENT

No separate payment will be made for expansion joints and all costs in connection therewith shall be included in the contract unit and lump sum prices for the items of work to which the work is incidental.

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

Premolded Expansion Joint Filler Strips

Certified manufacturer's test reports shall be provided for premolded expansion joint filler strips to verify compliance with applicable specification.

SD-07, Certificates

Field Molded Sealants

Premolded Expansion Joint Filler Strips

Certificates of compliance stating that the sealant, primer (when recommended by the sealant manufacturer) and expansion joint filler conform to the requirements specified.

PART 2 PRODUCTS

2.1 PREMOLDED EXPANSION JOINT FILLER STRIPS

Premolded expansion joint filler strips shall conform to ASTM D 1751; ASTM D 1752, Type I; or resin impregnated fiberboard conforming to the physical requirements of ASTM D 1752. Expansion joint filler strips for horizontal surfaces, such as tops of piers and lock walls, shall conform to ASTM D 1752, Type I only. Unless otherwise indicated, filler material shall be 1/2-inch thick and of a width applicable for the joint formed.

2.2 JOINT SEALANTS

Field molded sealants shall conform to ASTM C 920, Class 25. Use NT, Grade P for joints on horizontal surfaces and Grade NS for joints on vertical surfaces. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material (backer rod) shall be compressible, nonshrink, nonreactive with sealant, and nonabsorptive material type such as extruded butyl or polychloroprene foam rubber. The rod diameter shall be at least 1.25 times the opening width.

PART 3 EXECUTION

3.1 INSTALLATION

Joint locations and details, including materials and methods of installation of joint fillers, shall be as specified, as shown, and as directed. In no case shall any fixed metal be continuous through an expansion joint.

3.1.1 Expansion Joints

Premolded expansion joint filler shall be used in expansion and isolation joints in slabs around piers and between slabs on both horizontal and vertical surfaces where indicated. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/4-inch radius. Where the joint is to receive a sealant, 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. 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. In lieu of the wood strip, a removable expansion filler cap designed and fabricated for this purpose may be used.

3.1.1.1 Joints With Field-Molded Sealant

Expansion joints shall be filled with joint sealant, unless otherwise shown. Backer rod shall be installed prior to placement of sealant material. Types and locations of sealants and backer rod shall be as indicated. Joint surfaces shall be clean, dry, and free of oil or other foreign material which would adversely affect the bond between sealant and concrete. Joints shall not be sealed when the sealant, air or concrete temperature is less than 40 degrees F. 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.

-- End of Section --

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SECTION 03200

CONCRETE REINFORCEMENT

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SECTION 03200

CONCRETE REINFORCEMENT

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 318/318R	(2002) Building Code Requirements for Structural Concrete and Commentary

ASTM INTERNATIONAL (ASTM)

ASTM A 615/A 615M	(2001b) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4	(1998) Structural Welding Code - Reinforcing Steel

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI 1MSP	(2001) Manual of Standard Practice

1.2 MEASUREMENT AND PAYMENT

1.2.1 Steel Bars

Steel bars will be measured for payment by the pound in place. The measured lengths will be converted to weights for the size of bars listed by the use of the nominal weights per linear foot specified in ASTM A 615/A 615M. Steel in laps indicated on the drawings or required by the Contracting Officer will be paid for at the contract unit price. No payment will be made for the additional steel in laps which are authorized for the convenience of the Contractor. Payment for furnishing and placing steel bars will be made at the contract unit price per pound for "Deformed Steel Bars for Concrete Reinforcement."

1.2.2 Accessories

No separate payment will be made for accessories of which payment shall be included in the contract unit price for the items of work to which the accessories are incidental.

1.2.3 Dowels

Dowels will not be measured for payment. Payment for furnishing and installing dowels will be made at the contract unit price per each for "Dowels."

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-02, Shop Drawings

Detail Drawings; G,TSD

Detail drawings shall show reinforcing steel schedules, sizes, grades, and splicing and bending details. Drawings shall show support details including types, sizes and spacing.

SD-07, Certificates

Qualifications

Contracting Officer shall be furnished a list of names of qualified welders.

Certified Mill Reports

Certified copies of mill reports attesting that the reinforcing steel furnished meets the requirements specified shall be submitted prior to the installation of reinforcing steel.

1.4 QUALIFICATIONS

Welders shall be qualified in accordance with AWS D1.4. Qualification test shall be performed at the worksite and the Contractor shall notify the Contracting Officer 24 hours prior to conducting tests. Special welding procedures and welders qualified by others may be accepted as permitted by AWS D1.4.

1.5 DELIVERY AND STORAGE

Reinforcement and accessories shall be stored off the ground on platforms, skids, or other supports.

PART 2 PRODUCTS

2.1 REINFORCING STEEL

Reinforcing steel shall be deformed and smooth bars conforming to ASTM A 615/A 615M, grade 60 and sizes as shown.

2.2 WIRE TIES

Wire ties shall be 16-gauge or heavier black annealed steel wire.

2.3 SUPPORTS

Bar supports for formed surfaces shall be designed and fabricated in accordance with CRSI 1MSP and shall be steel or precast concrete blocks. Precast concrete blocks shall have wire ties and shall be not less than 4 inches square when supporting reinforcement on ground. Precast concrete block shall have compressive strength equal to that of the surrounding concrete. Where concrete formed surfaces will be exposed to weather or where surfaces are to be painted, steel supports within 1/2 inch of concrete surface shall be galvanized, plastic protected or of stainless steel. Concrete supports used in concrete exposed to view shall have the same color and texture as the finish surface. For slabs on grade, supports shall be precast concrete blocks, plastic coated steel fabricated with bearing plates, or specifically designed wire-fabric supports fabricated of plastic.

PART 3 EXECUTION

3.1 REINFORCEMENT

Reinforcement shall be fabricated to shapes and dimensions shown and shall conform to the requirements of ACI 318/318R. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. Safety caps shall be placed on all exposed ends of vertical concrete reinforcement bars that pose a danger to life safety. Wire tie ends shall face away from the forms.

3.1.1 Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318/318R at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated. If bars are moved more than one bar diameter to avoid interference with other reinforcement, conduits or embedded items, the resulting arrangement of bars, including additional bars required to meet structural requirements, shall be approved before concrete is placed.

3.1.1.1 Concrete Cover Tolerances

The allowable variation for minimum cover shall be as follows:

MINIMUM COVER	VARIATION
2-inch	+1/4-Inch
3-Inch	+3/8-Inch
4-Inch	+3/8-Inch

3.1.2 Splicing

Splices of reinforcement shall conform to ACI 318/318R and shall be made only as required or indicated. Splicing shall be by lapping bars smaller than size #14. Lapped bars shall 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 one-fifth the required length of lap or 6 inches.

3.1.3 Dowels

Dowels shall be installed in the expansion joints of the reinforced concrete cap as detailed on the drawings.

3.2 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and maintain records of its quality control for all operations performed, including, but not limited to, the following:

a. Material quality

b. Placement of bars.

c. Splicing of bars.

d. Observance of safety regulations.

-- End of Section --

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SECTION 03300

CONCRETE

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 304R	(2000) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305R	(1999) Hot Weather Concreting

ASTM INTERNATIONAL (ASTM)

ASTM C 31/C 31M	(2000el) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(2002a) Concrete Aggregates
ASTM C 39/C 39M	(2001) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 42/C 42M	(1999) Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM C 109/C 109M	(2002) Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens)
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(2002a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 173	(1994ael) Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 204	(2000) Fineness of Hydraulic Cement by Air Permeability Apparatus
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C 260	(2001) Air-Entraining Admixtures for Concrete
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 311	(2000el) Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete
ASTM C 494/C 494M	(1999ael) Chemical Admixtures for Concrete
ASTM C 595	(2002a) Blended Hydraulic Cements
ASTM C 597	(1997) Pulse Velocity Through Concrete
ASTM C 618	(2001) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 803/C 803M	(1997el) Penetration Resistance of Hardened Concrete
ASTM C 805	(2002) Rebound Number of Hardened Concrete
ASTM C 989	(1999) Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
ASTM E 329	(2002) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA TMMB 100	(2001) Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards
NRMCA QC 3	(2002) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities

1.2 MEASUREMENT AND PAYMENT

1.2.1 Structural Concrete

Measurement of concrete placed in the dry will be made on the basis of the actual volume of concrete within the pay lines of the structure. No deductions will be made for rounded or beveled edges or space occupied by metal work, electrical conduits, nor for voids or embedded items which are less than five cubic feet in volume. Unless otherwise specified, payment for concrete will be made at the respective contract price per cubic yard for the various items in the bidding schedule, which prices shall include the cost of all labor, materials, and the use of all equipment and tools required to complete the work, including required formwork; except the reinforcement and embedded parts which are specified to be paid for separately. No payment will be made for concrete that is wasted or used for the Contractor's convenience. Cast-in-place concrete placed in the dry at the project site will be paid for at the contract unit price per cubic yard for "Reinforced Concrete Pierhead Cap."

1.2.2 Tremie Concrete

The volume of concrete placed above and below water by the tremie method will be measured by the cubic yard and based on certified concrete batch delivery tickets. Determination of quantities will be made by the Government's on-site Representative and having once been made, will not be reopened, except on evidence of collusion, fraud or obvious error. Prior to any placement by the tremie method, the Contractor shall coordinate all operations with the Government's Representative to ensure that batch tickets are submitted at the appropriate times. All acceptably completed work and material required to place concrete by pumping or gravety fed tremie will be paid for at the contract unit price per cubic yard for "Tremie Concrete."

1.2.3 Coring

Coring will be measured by the linear foot from the top elevation of the core to the bottom elevation of the core. Coring through the concrete cap for the placement of fabric containment bags and tremie concrete in stone voids will be paid for at the contract unit price per linear foot for the payment item "Coring."

1.2.4 Fabric Formed Concrete

The volume of tremie concrete placed within fabric bags will be measured by the cubic yard and based on certified concrete batch delivery tickets. Price per cubic yard shall include furnishing and installing fabric bags of the required diameter and length and videotaping of voids.

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

Concrete Placement Plan; G,TSD

Prior to the placement of concrete, the Contractor shall prepare and submit a detailed plan for the proposed work, including tremie placement operations.

SD-03, Product Data

Construction Equipment List

Data on concrete plant, equipment and curing medium and methods shall be submitted to the Contracting Officer for review.

Mix Designs; G,TSD

At least 14 days prior to commencing concrete placing operations, the Contractor shall submit a statement accompanied by test results from an independent commercial testing laboratory complying with ASTM E 329, attesting that the ingredient proportions selected will produce concrete of the qualities required. No substitutions shall be made in the materials used in the work without additional test certifications to show that the quality of the concrete is satisfactory.

Fabric Bags; G,TSD

Complete description of fabric bags to be used to encase tremie concrete within voids below concrete cap. Description shall include material type, strength, sizes, etc available for the proposed installation.

SD-06, Test Reports

Sampling and Testing

Certified copies of laboratory test reports, including all test data, for compressive strength, air entrainment, slump, aggregate, admixtures, and curing compound. These tests shall be made by an approved commercial laboratory or by a laboratory maintained by the manufacturers of the materials.

SD-07, Certificates

The following items shall be certified for compliance with all specification requirements:

Cementitious Materials

Cement will be accepted on the basis of manufacturer's certification of compliance, accompanied by mill test reports attesting that the materials meet the requirements of the specification under which it is furnished. No cement shall be

used until notice of acceptance has been given by the Contracting Officer. Cement may be subjected to check testing by the Government from samples obtained at the mill, at transfer points, or at the project site.

Accelerating Admixture

Impervious Sheet Curing Materials

Air-entraining Admixture

Water-reducing Admixture

Curing Compound

Retarding Admixture

Antiwashout Admixture

Microsilica Admixture

1.4 GENERAL REQUIREMENTS

1.4.1 Strength Requirements

Structural concrete for cast-in-place work shall have a 28-day compressive strength of 4000 pounds per square inch. 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. The 28-day compressive strength for tremie concrete shall be 4000 pounds per square inch.

1.4.2 Air Entrainment

Concrete in the structure, excluding tremie concrete, shall contain from 4 to 7 percent total air except that when the nominal maximum size coarse aggregate is 3/4-inch, the total air shall be between 4.5 and 7.5 percent.

1.4.3 Special Properties

Concrete may contain other admixtures, such as water reducers, or set retarding agents to provide special properties to the concrete, if approved. Tremie concrete shall contain a minimum of 600 pounds of cementitious material per cubic yard, antiwashout admixture and microsilica mineral admixture. Concrete placed underwater by tremie, whether by gravity flow or pumped, shall conform to the material and placement requirements of ACI 304R.

1.4.4 Slump

Slump shall be between 1 inch and 4 inches. Slump for tremie concrete shall be within the range of 7 inches to 9 inches.

1.4.5 Water-Cement Ratio

The maximum water/cement ratio shall be 0.46 to 1 by weight. Tremie concrete shall have a maximum water/cement ratio of 0.40 to 1 by weight.

1.5 STORAGE OF MATERIALS

Cement shall be stored in weathertight buildings, bins, or silos which will exclude moisture and contaminants. 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. 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.

PART 2 PRODUCTS

2.1 ADMIXTURES

Admixtures, when required or approved, shall conform to the following:

2.1.1 Accelerating Admixture

ASTM C 494/C 494M, Type C or E.

2.1.2 Air-Entraining Admixture

ASTM C 260.

2.1.3 Water-Reducing Admixture or Retarding Admixture

ASTM C 494/C 494M, Type A, B or D.

2.1.4 Antiwashout Admixture

The antiwashout admixture shall be a cellulose derivative designed to reduce the washing out of fines (including cement) and segregation of concrete placed underwater. The admixture, when combined with water reducing admixture, shall result in washout of cement paste no more than five percent. Relative washout shall be determined by placing a sample of the concrete proportioned to meet the requirements specified in a wire-mesh basket, dropping it through a column of water three times, and measuring the change in mass after each drop. This admixture is not required in tremie concrete filled fabric bags.

2.1.5 Microsilica Admixture

Microsilica mineral admixture shall be obtained as a by-product from the manufacture of solely silicon metal in electric arc furnaces. Condensed silica fume shall be processed and sized to a fineness of approximately 200,000 cm^2 per gm at a porosity of 0.500 when tested in accordance with

the procedures of ASTM C 204 and have an amorphous silica (Sio^2) content of not less than 85 percent of the total fume. When tested in accordance with ASTM C 311, the microsilica shall have a moisture content of less than 3 percent and loss of ignition of not greater than 6 percent. A manufacturer's certificate of compliance with this requirement and applicable provisions of ASTM C 618 is required.

2.1.5.1 Combinations of Microsilica and Chemical Admixtures

Microsilica shall be supplied proportioned and combined with other admixtures, as necessary, from a supplier regularly engaged in the sale of this combination product as a concrete admixture. This combination admixture shall be batched with the concrete in either of two forms or types. The wet type shall consist of a liquid slurry containing approximately 50 percent solids with a water-reducing admixture meeting requirements specified herein. The dry form shall be a powder capable of being batched with a water reducing admixture that is either liquid or dry. Both types shall be compatible with a water reducing admixture that could be added at the concrete batch plant or at the placement site.

2.2 CEMENTITIOUS MATERIALS

Cementitious materials shall each be of one type and from one source when used in concrete which will have surfaces exposed in the finished structure. Cementitious materials shall conform to one of the following:

2.2.1 Cement

ASTM C 150, Type I or II, low alkali required when the aggregates contain potentially reactive chert in excess of 5 percent.

2.2.2 Portland Blast-Furnace-Slag Cement

ASTM C 595, Type IS.

2.2.3 Portland-Pozzolan Cement

ASTM C 595, Type IP.

2.2.4 Pozzolan

ASTM C 618, Class C or F.

2.2.5 Pozzolan-Modified Portland Cement

ASTM C 595, Type I (PM).

2.2.6 Slag-Modified Portland Cement

ASTM C 595, Type I (SM).

2.2.7 Ground Iron Blast-Furnace Slag

ASTM C 989, Grade 120.

2.3 AGGREGATES

Aggregates shall conform to the following:

2.3.1 Normal Weight Aggregate

ASTM C 33. Grading requirement for coarse aggregate shall conform to size number 57 and grading requirement of coarse aggregate for tremie concrete shall conform to size number 67.

2.4 CURING MATERIALS

2.4.1 Impervious Sheet Curing Materials

ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.

2.4.2 Membrane-Forming Curing Compound

ASTM C 309, Type 1-D or Type 2, Class A.

2.5 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated or as needed for the application.

2.6 WATER

Water shall be potable or nonpotable conforming to COE CRD-C 400. Nonpotable water may be used providing it produces mortar cubes having 7-and 28-day strengths at least 90 percent of the strength of similar specimens made with water from a municipal supply. The strength comparison shall be made on mortars, identical except for mixing water, prepared and tested in accordance with ASTM C 109/C 109M. Water for curing shall not contain any substance injurious to concrete, or which causes staining.

2.7 FIBER REINFORCING

Fibrous concrete reinforcement for structural concrete shall be equal to Fibermesh MD as manufactured by Fibermesh, a division of Synthetic Industries, 4019 Industry Drive, Chattanooga, Tennessee 37416, Ph: 423-892-7243.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACES

Surfaces to receive concrete shall be clean, free from oil, frost, ice, mud, coatings, and debris.

3.1.1 Coring Holes

Holes in the concrete cap for the placement of tremie concrete in fabric bags within and below shall be core drilled by rotary or percussion drills. The minimum diameter of holes shall be four (4) inches. Re-drilling caused by any of the Contractor's tremie concrete placement operations

shall be at his/her expense. Steel reinforcement, variable quality concrete, and other construction may be encountered during coring, the cost of which shall be included in the unit price for coring. Hole locations may be shifted, as approved by the Contracting Officer, to avoid the continual encountering of obstructions. Unfilled holes shall be used for additional vioeotaping of the voids below the concrete cap and to verify that fabric bags are properly installed. Any cored hole that is not utilized due to mechanical failure of equipment, inadequacy of concrete supply, or improper fabric formed concrete placement procedure shall be properly filled and replaced by another hole, at no additional cost to the Government for the fabric formed concreteaa or for the coring of the abandoned holes.

3.1.1.1 Hole Pattern

The on-site spacing of holes may be modified due to site conditions, as approved by the Contracting Officer. All attempts shall be made to select a pattern that will avoid the repetitive hitting of obstructions. Subject to the approval of the Contracting Officer, changes in the number and spacing of holes may be allowed.

3.1.1.2 Videotaping of Voids

After coring holes in the concrete pierhead cap, the Contractor shall perform a survey of the voids below by videotaping at each hole location. Videotape shall be VHS format and the Contractor shall provide one copy to the Contracting Officer. All work shall be performed in accordance with the approved "Work Plan."

3.2 INSTALLATION OF EMBEDDED ITEMS

Embedded items shall be free from oil, loose scale or rust, and paint. Embedded items shall be firmly and securely installed at the locations indicated and required to serve the intended purpose. Voids in sleeves, slots and inserts shall be filled with readily removable material to prevent the entry of concrete.

3.3 BATCHING, MIXING AND TRANSPORTING CONCRETE

Ready-mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94/C 94M, except as otherwise specified. Truck mixers, agitators, and nonagitating units shall comply with NRMCA TMMB 100. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA QC 3. On-site batching plant, method of measuring materials, and the mixer shall conform to the applicable provisions of ASTM C 94/C 94M, except as otherwise specified.

3.3.1 Admixtures

Admixtures shall be batched within an accuracy of 3 percent. Where two or more admixtures are used in the same batch, they shall be batched separately and must be compatible. Retarding admixture shall be added within 1 minute after addition of water is complete or in the first quarter of the required mixing time, whichever is first. Concrete that shows evidence of total collapse or segregation caused by the use of admixture shall be removed from the site.

3.3.2 Control of Mixing Water

No water from the truck system or elsewhere shall be added after the initial introduction of mixing water for the batch except when on arrival at the jobsite, the slump of the concrete is less than that specified. Water added to bring the slump within the specified range shall not change the total water in the concrete to a point that the approved water-cement ratio is exceeded. The drum shall be turned an additional 30 revolutions, or more, if necessary, until the added water is uniformly mixed into the concrete. Water shall not be added to the batch at any later time.

3.4 SAMPLING AND TESTING

Sampling and testing is the responsibility of the Contractor and shall be performed by an approved testing agency.

3.4.1 Aggregates

Aggregates for normal weight concrete shall be sampled and tested in accordance with ASTM C 33. Gradation tests shall be performed on the first day and every other day thereafter during concrete construction.

3.4.2 Sampling of Concrete

Samples of concrete for air, slump, and strength tests shall be taken in accordance with ASTM C 172. If pumped concrete will be used, samples shall be obtained at the point of final placement.

3.4.2.1 Air Content

Test for air content shall be performed in accordance with ASTM C 173 or ASTM C 231. A minimum of 2 tests per day shall be conducted when placing concrete. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Contracting Officer's Representative.

3.4.2.2 Slump

At least 2 slump tests shall be made on randomly selected batches of each mixture of concrete during each day's concrete placement. Tests shall be performed in accordance with ASTM C 143/C 143M. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Contracting Officer's Representative.

3.4.3 Evaluation and Acceptance of Concrete

3.4.3.1 Frequency of Testing

Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 250 cubic yards of concrete. A sample consists of three (3) cylinders.

3.4.3.2 Testing Procedures

Cylinders for acceptance tests shall be molded and cured in accordance with ASTM C 31/C 31M. Cylinders shall be tested in accordance with ASTM C 39/C 39M. 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 or at another specified test age. Strength tests of field cured specimens shall be made when directed, to check the adequacy of curing and protection of concrete in the structure, following the procedures in Section 7.4 of ASTM C 31/C 31M.

3.4.3.3 Evaluation of Results

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 required strength by more than 500 pounds per square inch. If any of the requirements are not met, steps shall be taken immediately to raise the strength level.

3.4.4 Investigation of Low-Strength Test Results

When any strength test of standard-cured test cylinder falls below the specified strength requirement by more than 500 pounds per square inch, or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that load-carrying capacity and durability of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803/C 803M or ASTM C 805 may be permitted by the Contracting Officer to determine the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests, unless properly calibrated and correlated with other test data, shall not be used as a basis for acceptance or rejection. When strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42/C 42M. 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 shall be determined by the Contracting Officer to least impair the strength of the structure. If the concrete in the structure will be dry under service conditions, the cores shall be air dried (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for seven days before testing and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be tested after moisture conditioning in accordance with ASTM C 42/C 42M. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to or at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. Concrete work evaluated and found deficient shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies shall be as approved by the Contracting Officer, and shall be performed at the expense of the Contractor.

3.4.5 Quality Assurance

The Government may independently sample and test aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples.

3.5 CONVEYING CONCRETE

Concrete shall be conveyed from mixer to forms as rapidly as possible and within the time interval specified in paragraph "CONCRETE PLACEMENT" by methods which will prevent segregation or loss of ingredients.

3.5.1 Chutes

When concrete can be placed directly from a truck mixer or other transporting equipment, chutes attached to this equipment may be used. Separate chutes will not be permitted except when specifically approved.

3.5.2 Buckets

Bucket design shall be such that concrete of the required slump can be readily discharged. Bucket gates shall be essentially grout tight when closed. The bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

3.5.3 Pumps

Concrete may be conveyed by positive displacement pumps when approved. Pump shall be the piston or squeeze pressure type. Pipeline shall be rigid steel pipe or heavy duty flexible hose. Inside diameter of the pipe shall be at least three times the nominal maximum size of the coarse aggregate in the concrete mixture to be pumped but not less than 4 inches. The maximum size of the coarse aggregate and the concrete quality shall be as previously specified. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer. Concrete shall be supplied to the pump continuously. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place. After each use, the equipment shall be thoroughly cleaned. Flushing water shall be wasted outside the forms at a location approved by the Contracting Officer.

3.6 CONCRETE PLACEMENT

Mixed concrete which is transported in truck mixers or agitators or concrete which is truck mixed, shall be discharged within 1-1/2 hours or before the drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates or the introduction of the cement to the aggregates. These limitations may be waived by the Government if the concrete is of such slump after the 1-1/2 hour time or 300 revolution limit has been reached that it can be placed, without the addition of water to the batch. 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 truck.

3.6.1 Placing Operation

Concrete shall be handled from mixer 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, cold, wind, waves, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 3 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 18 inches thick, except that all slabs shall be placed in a single layer. Concrete required to be placed underwater shall be tremied into place. Sufficient placing capacity shall be provided so that concrete can be kept plastic and free of cold joints while it is being placed.

3.6.1.1 Placement by Pumping or Tremie

Method of placement and equipment to be used, whether by pumping or by tremie, shall conform to the requirements of ACI 304R and meet with the approval of the Contracting Officer. Sufficient data shall be included in the Contractor's submittal entitled Construction Equipment List. When concrete is deposited by the tremie method, the tremie shall be watertight and sufficiently sized to permit a free flow of concrete. The discharge end shall be kept submerged continuously in the concrete and the shaft kept full of concrete to a point well above the water surface. Discharge end shall be designed to enter point of discharge and remain same end area as remainder of tremie without restricting flow. When placement is performed by pumping, work shall be in accordance with paragraph "Pumps." Placement shall be continuous, for either method, until each area is filled to within 6 +/- inches of height shown on the drawings. Contractor's method and equipment must ensure placement to the limits shown on drawings.

3.6.2 Consolidation

Immediately after placing, each layer of concrete, excluding underwater tremie, shall be consolidated by internal vibrators. 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 8000 vibrations per minute, and the head diameter and amplitude shall be appropriate for 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 few inches. 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 withdrawn slowly. The use of form vibrators must be specifically approved. Vibrators shall not be used to transport concrete within the forms or for concrete deposited by the tremie method.

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 for above water placement and water for tremie concrete placement and the temperature of surfaces to receive concrete shall be not less than 40 degrees F. The temperature of the concrete when placed having a minimum dimension less than 12 inches shall be between 60 degrees and 75 degrees F. The temperature of the concrete when placed having a minimum dimension of 12 inches and greater, 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, chemical admixture conforming to ASTM C 494/C 494M, Type C or E may be used.

3.6.4 Warm Weather Requirements

The temperature of the concrete placed during warm weather 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. An approved retarder may be used to facilitate placing and finishing. Steel forms and reinforcement shall be cooled 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.

3.6.5 Fiber Reinforced Concrete

All structural concrete shall contain fibrous concrete reinforcement. One and one-half (1 1/2) pounds of fibers shall be added to each cubic yard of concrete. Fiberous reinforcement will not be required in tremie concrete.

3.7 FINISHING CONCRETE

3.7.1 Appearances

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method which does not harm the concrete and which is approved by the Contracting Officer.

3.7.2 Formed Surfaces

Surfaces, unless other type of finish is specified, shall be left with the texture imparted by the forms except defective surfaces shall be repaired as described below. Uniform color shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure which is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement, with joints between panels planned in approved relation to openings and other features. Forms shall not be reused if there is any evidence of surface wear or defects which would impair the quality of the surface.

3.7.2.1 Repair of Surface Defects

Surface defects, including fins, loose materials and tie holes, shall be repaired within 24 hours after the removal of forms. Honeycombed and other defective areas shall be cut back to solid concrete or to a depth of not less than 1 inch, whichever is greater. Edges shall be cut perpendicular to the surface of the concrete. The prepared areas shall be dampened and brush-coated with neat cement grout. The repair shall be made using mortar consisting of not more than 1 part cement to 2-1/2 parts sand. The mixed mortar shall be allowed to stand to stiffen (approximately 45 minutes), during which time the mortar shall be intermittently remixed without the addition of water. After the mortar has attained the stiffest consistency that will permit placing, the patching mix shall be thoroughly tamped into place by means approved by the Contracting Officer and finished slightly higher than the surrounding surface. For surfaces permanently exposed to view, the cement used in the patching mortar shall be a blend of job cement and white cement proportioned to produce a finished repair surface matching, after curing, the color of adjacent surfaces. Holes left after the removal of form ties shall be cleaned and filled with patching mortar. Holes left by the removal of tie rods shall be reamed and filled by dry-packing. Repaired surfaces shall be cured as required for adjacent surfaces. The temperature of concrete, mortar patching material, and ambient air shall be above 50 degrees F while making repairs and during the curing period. Concrete with defects which affect the strength of the member or with excessive honeycombs will be rejected, or the defects shall be corrected as directed.

3.7.3 Unformed Surfaces

All unformed surfaces, that are not to be covered by additional concrete or backfill, shall be float-finished to elevations shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown on the drawing and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown on the drawings. Joints shall be carefully made with a jointing tool. In cold weather, the air temperature in areas where concrete is being finished shall not be less than 50 degrees F for concrete having a minimum thickness of 12 inches and not less than 60 degrees F for concrete having a minimum dimension less than 12 inches. In hot windy weather when the rate of evaporation of surface moisture, as determined by methodology presented in ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour; coverings, windbreaks, shading, or fog sprays shall be provided as necessary to prevent premature setting and drying of the surface. The dusting of surfaces with dry materials or the addition of water during finishing will not be permitted. Finishing shall not be performed while there is excess moisture or bleeding water on the surface. Finished surfaces shall be plane, with no deviation greater than 1/4 inch when tested with a 10-foot straightedge.

3.7.3.1 Float Finish

Slabs shall be given a float finish. Screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. After the concrete has stiffened to permit the operation and the water sheen has disappeared, it shall be floated.

3.8 CURING AND PROTECTION

3.8.1 General

All concrete shall be cured by an approved method for the period of time given below:

Concrete with Type I or II cement	7 days

Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain, waves, and flowing water. Air and forms in contact with concrete and the concrete itself shall be maintained at a temperature above 50 degrees F for 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. All 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 shall be permitted near or in direct contact with the concrete at any time. Curing shall be accomplished by any of the following methods, or combination thereof, as approved. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25 degrees F in 24 hours.

3.8.2 Moist Curing

Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. When wooden forms are left in place during curing, they shall be kept wet at all times. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Horizontal surfaces shall be cured by ponding, by covering with a 2-inch minimum thickness of continuously saturated sand, or by covering with a polyethylene sheet, securely held in place for the required curing period.

3.8.3 Membrane Curing

Surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared. 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. Compound shall be applied in a two-coat continuous operation by mechanical spraying equipment, at a uniform rate of coverage in accordance with the manufacturer's printed instructions, but not more than one(1) gallon per 400 square feet, per coat. The second coat shall be applied perpendicular to the first coat. Concrete surfaces which have been subjected to rainfall or scouring by wave action within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. 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.

3.9 CLEANUP

Forms, plastic sheeting, loose concrete and other loose debris shall be removed from the work area as each segment is completed and cured and the waste material shall be properly disposed of.

3.10 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and maintain records of its quality control for all operations performed, including, but not limited to, the following:

3.10.1 Preparation for Placing

Joint materials, forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.10.2 Placing

The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location and shall be responsible for measuring and recording concrete temperatures, ambient temperature, weather conditions, time of placement, yardage placed, and method of placement.

3.10.3 Curing

3.10.3.1 Moist Curing

At least once each shift an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

3.10.3.2 Curing Compound

No curing compound shall be applied until it has been verified that the compound is properly mixed and ready for spraying. At the end of each operation, the quantity of compound used and the area of concrete surface covered shall be reported and the rate of coverage in square feet per gallon per coat shall be computed. The report shall state whether coverage is uniform.

3.10.3.3 Impervious Sheet Curing

At least once each shift, 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.

3.10.4 Action Required

3.10.4.1 Air Content

Whenever tests results approach the upper or lower specified limits, an adjustment should be made in the amount of air-entraining admixture batched. If a single test result is outside the specification limit, such adjustment is mandatory. As soon as practical after each adjustment another test shall be made to verify the correctness of the adjustment. Whenever the air content departs from the specified range, the concrete shall not be delivered to the forms.

3.10.4.2 Slump

Whenever test results approach the upper or lower specified limits, an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total free water does not exceed that amount specified in the approved mixture proportions based on the free water available with the fine aggregate and that amount of water batched. If the adjustments to the batch weights or water and fine aggregate do not satisfactorily produce the required slump, the mixture shall be reproportioned to meet the specified criteria and re-submitted to the Contracting Officer for approval. When a single slump is outside the specified limits, such adjustment is mandatory. As soon as practical after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever the slump exceeds the upper limit stipulated in PART 1, paragraph "Slump", the concrete shall not be delivered to the forms. Whenever two (2) consecutive slump tests, made during a period when there was no adjustment of batch weights, are above the upper specified limit, the slump shall be considered to be out of control and the concrete shall not be delivered to the forms. The mix proportions shall thereupon be adjusted by the Contractor at no additional cost to the Government.

3.10.4.3 Strength

If any concrete fails to meet all of the requirements for strength, the deficiency shall be corrected in a manner satisfactory to the Contracting Officer and at no additional cost to the Government.

3.10.4.4 Placing

The placing foreman shall not permit placing to begin until he or she has verified that an adequate number of acceptable concrete vibrators in working order and with competent operators are available. Placing shall not be continued if any pour is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.10.4.5 Curing

a. Moist Curing. When a daily inspection report lists an area of inadequate curing, the required curing period for that area shall be extended by one (1) day.

b. Curing Compound. When the coverage rate of curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

c. Impervious Sheet Curing. When a daily inspection report lists any tears, holes, or laps of 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 one (1) day.

3.10.4.6 Protection

When any concrete temperature during the period of protection fails to comply with the specifications, that fact shall be reported to the Contracting Officer and immediate steps shall be taken to correct the situation.

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DIVISION 03 - CONCRETE

SECTION 03750

DRILLING AND GROUTING FOR ANCHOR BOLTS

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SECTION 03750

DRILLING AND GROUTING FOR ANCHOR BOLTS

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.

ASTM INTERNATIONAL (ASTM)

ASTM C 39/C 39M	(2001) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 109/C 109M	(2002) Compressive Strength of Hydraulic Cement Mortars (Using 2-in. (50-mm) Cube Specimens)

1.2 MEASUREMENT AND PAYMENT

1.2.1 Drilling and Grouting

Drilling holes and grouting in anchor bolts will not be measured.

1.2.1.1 Anchor Bolts

Anchor bolts will not be measured and all costs incidental to furnishing and installing of anchor bolts shall be as specified in Section 05502, "METAL MATERIALS, STANDARD ARTICLES AND SHOP FABRICATED ITEMS."

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

Materials

Manufacturer's catalog data and recommended instructions for placement of grout and use of resin cartridges.

SD-07, Certificates

Materials

Certificates of compliance for materials test and analysis, accompanied by test reports attesting that the following materials meet the requirements of the specification under which they are furnished or manufactured:

Resin Cartridges

Polyester Resin Grout

1.4 DESCRIPTION

The work specified herein consists of the installation of anchor bolts to be used to anchor handrailing to existing concrete staircase and new concrete cap.

1.4.1 General

Anchor bolts, where indicated, shall be installed using preplaced polyester resin cartridges or polyester resin grout. Hole sizes shall be as recommended by the manufacturer for the grout types specified. At the Contractor's option, other grouting methods may be used subject to approval by the Contracting Officer. Alternate grout shall be equal in strength and durability to the types specified. The Contractor shall submit manufacturer's information including certified test reports for the alternate grout proposed. The Contractor shall be responsible for all changes in hole size and spacing required because of alternate grouting methods.

PART 2 PRODUCTS

2.1 ANCHOR BOLTS

Anchor bolts shall conform to the requirements of Section 05502, "METAL MATERIALS, STANDARD ARTICLES AND SHOP FABRICATED ITEMS."

2.2 RESIN CARTRIDGES

The resin cartridges shall be similar and equal to "Lokset II" manufactured by Fosroc Inc., 150 Carley Court, Georgetown, KY 40324, Ph: 502-863-6800. The cartridges shall have a casing of saturated polyester providing an optimum resistance to moisture, with a relatively high frangibility for complete mixing during installation. The cartridge shall contain two distinct fractions of unsaturated polyester resin and catalyst without an intervening mechanical membrane to assure proper mixing. The resin shall be high-strength polyester, highly filled with nonreactive inorganic aggregate of suitable mesh size. The catalyst shall contain peroxide, highly filled with a nonreactive inorganic filler. The compressive strength of the mixed and cured resin shall be 14,000 psi when tested in accordance with ASTM C 39/C 39M. Gel and cure times of cartridges shall be as specified by the manufacturer and as approved by the Contracting

Officer. The material shall be thixotropic and of such viscosity that the anchor bolt can adequately mix the material. Cartridges that are older than six months shall not be used.

2.3 POLYESTER RESIN GROUT

Polyester resin grout shall be a two-component, quick set, pourable grout consisting of liquid resin and filler-hardener with a compressive strength of not less than 14,000 psi after 7 days when tested in accordance with ASTM C 109/C 109M. The grout shall be similar and equal to "Anchortite," manufactured by ChemRex Inc., 889 Valley Park Dr., Shokopee, MN 55379, Ph: 1-800-433-9517..

PART 3 EXECUTION

3.1 DRILLING HOLES FOR ANCHOR BOLTS AND DOWELS

Holes shall be drilled by drilling equipment suitable for the intended purpose, as approved by the Contracting Officer. Diameter of holes shall be as recommended by the manufacturer for the size of anchor bolts being installed with resin cartridges or resin grout. Prior to insertion of cartridges or placement of grout, holes shall be cleaned out as recommended by the cartridge or grout manufacturer.

3.2 INSTALLATION OF ANCHOR BOLTS

3.2.1 General

At the Contractor's option, and subject to the approval of the Contracting Officer, anchor bolts may be installed using polyester resin cartridges or polyester resin grout in drilled holes.

3.2.1.1 Resin Cartridges

After the holes are cleaned, the resin cartridges shall be inserted into the hole taking care not to rupture the skin. To avoid premature rupture of the resin cartridges, it may be necessary to place them in a thin-walled tube and insert the tube in the drilled hole to the specified depth. The tube shall subsequently be carefully withdrawn prior to insertion of the anchor bolts. After the resin cartridges have been placed in the holes, anchor bolts shall be rotated through the cartridges to bottom of hole in accordance with the cartridge manufacturer's recommendations in order to rupture the skin and mix the resin. The method, rotation or vibration time (as applicable), and speed of rotation shall be as recommended by the manufacturer and approved by the Contracting Officer.

3.2.1.2 Polyester Resin Grout

Installation of anchor bolts shall be in accordance with the polyester resin grout manufacturer's written instructions.

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DIVISION 05 - METALS

SECTION 05501

METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS

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SECTION 05501

METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS

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 designations only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 348	(2000) Structural Joints Using ASTM A325 or A490 Bolts

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 780	(2001) Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2002) Structural Welding Code - Steel

1.2 PAYMENT

No separate payment will be made for the material and work covered under this Section and all costs in connection therewith shall be included in the applicable contract price for the item to which the material and work pertains.

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

Material and Work Orders; G,AOF

The Contractor shall furnish the Contracting Officer with three copies of all purchase and mill orders, shop orders for materials and work orders, including all new orders placed by the Contractor and old orders extended by each supplier. The Contractor, at the time of submittal of shop drawings, shall furnish a list designating the material to be used for each item. Where mill tests are required, the purchase orders shall contain the site address and the name of the testing agency. The Contractor shall also 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 piece, the number of pieces, the total weight, and if shipped by rail in carload lots, the car initial and number.

SD-07, Certificates

Qualification of Welders and Welding Operators

Certifications for welders and welding operators shall be submitted prior to commencing fabrication.

1.4 DESCRIPTION

This Section includes the general workmanship standards applicable to the fabrication, assembly and testing of various items of metalwork to insure conformance with the specifications and miscellaneous requirements incident to the work. The requirements are in addition to those contained in other Sections for the specific items of work as indicated on the drawings.

1.5 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/D1.1M, 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 ZINC COATINGS

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123/A 123M. 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. Items specified to be galvanized shall be hot-dip galvanized after fabrication.

PART 3 EXECUTION

3.1 STRUCTURAL FABRICATION

3.1.1 General

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 on the drawings, or otherwise approved. Bends shall be made by approved dies, press breaks, 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. Flame cutting of material other than structural steel shall be subject to approval and, where proposed, shall be indicated on shop drawings submitted to the Contracting Officer. Shearing shall be accurately done and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Reentrant cuts shall be filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free from twists, bends, and open joints. All bolts and nuts shall be tight.

3.1.2 Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape of approximately the same temperature as the material being measured at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings or as specified in the Section pertaining to the specific item of work. Except as required to meet requirements above, an allowable variation of 1/32-inch is permissible in the overall length of individual component members with both ends milled; individual component members without milled ends shall not deviate from the dimensions shown on the drawings by 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.

3.1.3 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a smooth surface, free from cracks and notches, is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1/D1.1M, 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 cuts 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.

3.2 WELDING

3.2.1 Structural Steel

3.2.1.1 General

Unless otherwise authorized or specified, welding of structural steel shall be by an electric arc welding process, using a method which excludes the atmosphere from the molten metal. Welding, unless specified otherwise, shall conform to the applicable provisions of Section 1 through 7 and Sections 9 through 11 of AWS D1.1/D1.1M.

3.2.1.2 Welding Equipment

All items of welding equipment shall conform to the requirements of AWS D1.1/D1.1M.

3.2.1.3 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. Only low-hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedure to be furnished by the Contractor. To maintain low moisture of low-hydrogen electrodes, a controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1/D1.1M, Subsection 4.5.

3.2.1.4 Inspection

Welding shall be subject to inspection by Government Inspectors to determine conformance with the requirements of AWS D1.1/D1.1M, the approved welding procedures, and provisions stated elsewhere in these specifications. The Contractor shall maintain an adequate inspection system and perform the necessary inspections in accordance with the clause entitled "Inspection of Construction" of Section 00700, "CONTRACT CLAUSES."

3.3 BOLTED CONNECTIONS

3.3.1 Structural Steel Connections

Bolts, nuts, and washers shall be of the type specified herein or indicated on the drawings. All nuts shall be equipped with washers, except for high strength bolts which shall have a hardened washer under the element (nut or bolt head) turned in tightening, in accordance with AISC 348. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated on the drawings, the materials; workmanship; and installation shall conform to the applicable provisions of AISC 348.

3.3.1.1 Bolt Holes

All bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

a. Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and not more than 1/16-inch larger than the diameter of the bolt.

3.4 INSTALLATION

3.4.1 General

Where units or items are shipped as assemblies, they will be inspected by the Contracting Officer prior to installation. Pipe wrenches, cold chisels, or other tools likely to cause damage to the surfaces of rods, nuts, or other parts shall not be used for the work of assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly, but care shall be taken not to overstress the threads. When a half nut is used for locking a full nut, the half nut shall be placed first and followed by the full nut. Threads of all bolts shall be lubricated by graphite and oil before assembly. Driving and drifting bolts or keys will not be permitted.

3.4.2 Alignment and Setting

Each structural unit shall be accurately aligned by the use of steel shims or other approved method so that no distortion of any member occurs before it is finally fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required.

3.5 QUALITY ASSURANCE

3.5.1 Tests of Materials

The Contractor shall, at his own expense, perform analysis and tests to demonstrate that all material is in conformity with the specifications. Should the Contractor desire to use stock materials not manufactured specifically for the work covered by these specifications, he shall submit evidence, satisfactory to the Contracting Officer, that such material

conforms to the requirements of the specifications. Detailed tests of these materials will then not be required, if so approved by the Contracting Officer. Tests, except where modified, shall be made as indicated in the respective detailed specifications or on the drawings and, unless otherwise authorized, in the presence of the Contracting Officer. The Contractor shall furnish the Contracting Officer certified reports of all required analysis and tests in accordance with paragraph "SUBMITTALS." The Contractor shall furnish the Contracting Officer, upon request, specimens and samples for independent analysis and tests. These specimens and samples shall be properly labeled and prepared for shipment.

3.5.2 Special Test Requirements

3.5.2.1 Nondestructive Testing

When doubt exists as to the soundness of any material part, such part may be subjected to any form of nondestructive testing 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 born by the Government. Any defects will be cause for rejection, and rejected parts shall be replaced and retested at the Contractor's expense.

3.5.3 Workmanship

Workmanship shall be of the highest grade in accordance with the best modern practices to conform to the specifications for the item of work being furnished.

3.6 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and maintain records of its quality control for all operations performed, including, but not limited to, the following:

a. Quality of materials.

b. Location and installation of required materials.

c. Fabrication and installation of components.

d. Observance of safety regulations.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 05 - METALS

SECTION 05502

METAL MATERIALS, STANDARD ARTICLES AND SHOP FABRICATED ITEMS

-- End of Section Table of Contents --

SECTION 05502

METAL MATERIALS, STANDARD ARTICLES AND SHOP FABRICATED ITEMS

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.

ASME INTERNATIONAL (ASME)

ASME B16.9	(2001) Factory-Made Wrought Buttwelding Fittings
ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(1987; R 1999) Square and Hex Nuts
ASME B18.21.1	(1999) Lock Washers (Inch Series)
ASME B18.22.1	(1985; R 1998) Plain Washers

ASTM INTERNATIONAL (ASTM)

ASTM A 36/A 36M	(2001) Carbon Structural Steel
ASTM A 53/A 53M	(2002) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 307	(2002) Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 325	(2002) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 563	(2000) Carbon and Alloy Steel Nuts
ASTM A 572/A 572M	(2001) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 722/A 722M	(1998) Uncoated High-Strength Steel Bar for Prestressing Concrete
ASTM A 767/A 767M	(2000b) Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
ASTM F 436	(2002) Hardened Steel Washers

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-1923	(Rev A) Shield, Expansion (Lag, Machine and Externally Threaded Wedge Bolt Anchors)

FEDERAL STANDARDS (FED-STD)

FED-STD-595	(Rev B, Am 1) Colors, Volume 1

MASTER PAINTERS INSTITUTE (MPI)

MPI #9	(Jan 2003) Exterior Alkyd Enamel

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 20	(2002) Zinc-Rich Primers, (Type I - "Inorganic" and Type II - "Organic")

1.2 MEASUREMENT

The work covered by this Section will be measured by the unit as listed in Section 00010, "SOLICITATION, OFFER AND AWARD (SF 1442) AND BIDDING SCHEDULE," and will be paid for at the unit or lump sum contract price for the payment items listed below. The contract prices shall include all costs of completing the items of work as specified and as shown on the drawings. Items paid for by weight , will be based on the total computed weight in pounds, per fabricated or assembled pieces. Computed weights shall be the net calculated weights based on the nominal weights and dimensions of the various items of metal required in the assemblies. Deductions for bolt holes will not be required. Measurement for items paid for by the length will be based on the length measured along the centerline of the item. No payment will be made for miscellaneous metal items which are specified to be included in the unit prices for the items of work which involve these metal items.

1.3 PAYMENT

Except for the items listed below, no separate payment will be made for furnishing and installing miscellaneous metal materials, standard articles and shop fabricated items. All costs in connection therewith, including painting unless otherwise specified, shall be included in the contract unit or lump sum prices for the items of work which involve these materials. For those items paid for on the basis of weight, no payment will be made for material in excess of the net weight as calculated from the dimensions shown on the approved shop drawings.

a. Wales. This item includes fabricating and installing wale assemblies, including splices, plates, bolts, nuts, washers, and other miscellaneous metal items necessary for a complete installation. Payment will be made at the applicable contract unit price per pound for item "Wales."

b. All-Thread Rebar Tie Rods and Couplings. This item includes fabrication and installation of threaded bars, nuts, plates, threaded rebar couplings, and other miscellaneous metal items necessary for a complete tie rod assembly installation. Payment will be made at the applicable contract unit price per each assembly of the various listed lengths for item "Tie Rods - 68'-72' Long."

c. Handrail. This item includes fabricating and installing welded steel pipe handrail, bolts and nuts, anchor bolts and nuts, drilling and grouting for anchor bolts, and all items necessary for a complete installation. Payment will be made at the applicable contract lump sum price for "Galvanized Steel Pipe Handrailing."

d. Cleats. This item includes the fabrication and installation of cleats with welded anchorage to sheet piling, end caps, painting, and all items necessary for a complete installation. Payment will be made at the applicable contract unit price per each for "Fabricated Steel Cleats."

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-02, Shop Drawings

Miscellaneous Metal and Shop Fabricated Items; G,TSD

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Any component part of fabricated items omitted on contract drawings shall be detailed by the fabricator on the detail drawings. Detail drawings for the following items: Handrailing, Cleats.

SD-04, Samples

Miscellaneous Metal Items; G,AOF

Samples shall be full size, taken from manufacturer's stock or fabricated, and shall be complete as required for installation in the structure. After removal, samples may be installed in the work, provided each sample is clearly identified and its location recorded. Samples of the following items, one of each type: Handrail Pipe and Fittings, Cleats.

SD-07, Certificates

Miscellaneous Metal Materials

Certificates for material tests and analysis.

1.5 DESCRIPTION

The work covered by this Section consists of fabricating, furnishing and installing miscellaneous metal materials, standard articles and shop fabricated items. Additional fabrication requirements and workmanship provisions for items specified shall conform with the requirements of Section 05501, "METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS."

1.6 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness.

1.7 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish. Galvanized steel that is in contact with concrete shall be chromate treated in accordance with ASTM A 767/A 767M.

1.8 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.9 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved.

1.10 STORING AND HANDLING OF MATERIALS

All materials which are delivered in advance of contemplated use shall be given protected storage off the ground. All materials which are damaged during storage and are not approved for use by the Contracting Officer shall be replaced with new materials.

PART 2 PRODUCTS

2.1 MISCELLANEOUS METAL MATERIALS AND STANDARD ARTICLES

Materials and standard articles shall conform to the respective specifications and other designated requirements. Sizes shall be as specified or shown on drawings. Where material requirements are not specified, materials furnished shall be suitable for the intended use and shall be subject to the approval of the Contracting Officer.

2.1.1 Wales

Wales shall conform to ASTM A 572/A 572M, Grade 50.

2.1.2 Other Structural Steel

Other structural shapes, plates and bars shall conform to ASTM A 36/A 36M, unless otherwise indicated on the drawings.

2.1.3 Steel Pipe and Pipe Fittings

2.1.3.1 Pipe

Steel pipe shall conform to ASTM A 53/A 53M, Type E or S, Grade B, Schedule 80.

2.1.3.2 Pipe Fittings

a. Butt-welding. ASME B16.9.

2.1.4 All-Thread Rebar Tie Rods and Couplings

ASTM A 722/A 722M.

2.1.5 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.

2.1.5.1 High-Strength Bolts, Nuts, and Washers

a. Bolts - ASTM A 325, Type 3.

b. Nuts - ASTM A 563, Grade C3 or DH3.

c. Washers - ASTM F 436, Type 3.

2.1.5.2 Bolts, Nuts, and Washers (Other Than High-Strength)

a. Bolts - ASTM A 307, Grade A, galvanized, and ASME B18.2.1, as indicated on the drawings.

b. Nuts - ASTM A 563, Grade A, galvanized, and ASME B18.2.2, as indicated on the drawings.

c. Washers

(1) Plain Washers

ASME B18.22.1, Type B, galvanized.

(2) Lock Washers

ASME B18.21.1, galvanized.

2.1.6 Anchor Bolts, Nuts and Washers

Anchor bolts, nuts and washers shall be of the material, grade, type, class, style, and finish indicated or best suited for intended use. Nuts shall be hex type unless otherwise indicated.

2.1.6.1 Anchor Bolts and Nuts

a. Anchor Bolts. ASTM A 307, Grade A, galvanized, and ASME B18.2.1, as indicated on the drawings.

b. Nuts. ASTM A 563, Grade A, galvanized, and ASME B18.2.2, as indicated on the drawings.

2.1.7 Expansion Anchors

CID A-A-1923, type as required, except that nail driven types will not be acceptable, galvanized unless otherwise indicated.

2.2 PAINT FOR CLEATS

Paint shall be a commercially available product and shall be the manufacturer's best quality grade.

2.2.1 Primer Coat

The paint to be used for the prime coat on metal surfaces shall conform to SSPC Paint 20, Type I.

2.2.2 Finish Coats

Paint to be used for the finish coats on metal surfaces shall conform to MPI #9, yellow (color 23655 of FED-STD-595).

2.3 SHOP FABRICATED METAL ITEMS

Shop fabricated metal items shall conform to the requirements and details as specified or shown on the drawings and to the workmanship provisions and other applicable fabrication requirements as specified in Section 05501, "METALWORK FABRICATION AND MISCELLANEOUS PROVISIONS."

2.3.1 Handrailing

Handrails shall be designed to resist a concentrated load of 200 pounds in any direction at any point of the top of the rail or 20 pounds per foot applied horizontally to top of the rail, whichever is more severe. All handrailing shall be of the type specified and shown on the drawings 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.

2.3.1.1 Steel Handrails

Handrailings shall be 2 inch, schedule 80 steel pipe conforming to ASTM A 53/A 53M, Type S, Grade B and galvanized after fabrication. The steel pipe shall have plain ends, an outside diameter of 2.375 inches, and a wall thickness of .218 inches.

a. Fabrication: Rigid joints in railings shall be welded and flush-finished. 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. 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, but the thickness of the material at any point shall not be less than the wall thickness of the pipe. Railings shall be free of burrs, sharp corners, and sharp edges.

2.3.2 Cleats

Cleats shall be fabricated using 4 inch, schedule 80 steel pipe, end caps, steel rod and channel for base as shown on the drawings. Painting shall be performed after fabrication with ends of base channel cleaned and painted after field welding.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified.

3.2 HANDRAILING

Handrailing shall be installed as specified and shown on the drawings. All posts shall be installed plumb. Post base plate anchors shall be embedded in polyester resin in accordance with Section 03750, "DRILLING AND GROUTING FOR ANCHOR BOLTS." All rails shall be installed parallel to structure surfaces.

3.3 CLEATS

Cleats shall be attached to the top of concrete pier caps at locations shown by drilling holes and inserting expansion anchors. Finish coats of paint shall be applied prior to installation.

3.4 PAINTING

Steel cleats shall be painted with one coat of primer and two coats of finish paint. Metal surfaces shall be solvent-cleaned to remove oil and grease. Surfaces that contain loose rust, loose mill scale or other foreign substances shall be cleaned by wire brushing. Minor amounts of residual rust that cannot be removed by applying a sharp knife to any edge, will be allowed to remain. The prime coat of paint specified shall be applied as soon as possible after cleaning of surfaces. Prior to applying finish coats of paint on shop painted surfaces, all damaged areas of the coating shall be wire brushed and solvent-cleaned and touched up with the same type of paint used for the shop coat. All paint coats shall be applied in such manner as to produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, and other surface irregularities shall receive special attention to insure that they receive an adequate thickness of paint. Sufficient time shall elapse between successive coats to permit proper drying. At the time of application, paint shall show no signs of hard settling, excessive skimming, livering or other deterioration. Paint shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Paints of different manufacturer's shall not be mixed together. Where necessary to suit conditions of surface, temperature, weather, and method of application, paint may be thinned in accordance with manufacturer's directions. The three (3) coat paint system specified shall be applied so that the dry film thickness of the three coats at any point shall be not less than 4.0 mils with the primer having a minimum dry film thickness of 1.5 mils.

3.5 QUALITY ASSURANCE

3.5.1 Tests of Materials

The Contractor shall, at his own expense, perform analysis and tests to demonstrate that all material is in conformity with the specifications. Should the Contractor desire to use stock materials not manufactured specifically for the work covered by these specifications, he shall submit evidence, satisfactory to the Contracting Officer, that such material conforms to the requirements of the specifications. Detailed tests of these materials will then not be required , if so approved by the Contracting Officer. Tests, except where modified, shall be made as indicated in the respective detailed specifications or on the drawings and, unless otherwise authorized, in the presence of the Contracting Officer. The Contractor shall furnish the Contracting Officer certified reports of all required analysis and tests in accordance with paragraph "SUBMITTALS." The Contractor shall furnish the Contracting Officer, upon request, specimens and samples for independent analysis and tests. These specimens and samples shall be properly labeled and prepared for shipment.

3.5.2 Special Test Requirements

3.5.2.1 Nondestructive Testing

When doubt exists as to the soundness of any material part, such part may be subjected to any form of nondestructive testing 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 born by the Government. Any defects will be cause for rejection, and rejected parts shall be replaced and retested at the Contractor's expense.

3.6 QUALITY CONTROL

The Contractor shall establish and maintain a quality control system for all operations performed under this Section to assure compliance with contract requirements and maintain records of its quality control for all operations performed, including, but not limited to, the following:

a. Quality of materials.

b. Location and installation of required materials.

c. Fabrication and installation of components.

d. Observance of safety regulations.

-- End of Section --