



## DEPARTMENT OF THE ARMY

SAVANNAH DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 889  
SAVANNAH, GEORGIA 31402-0889

REPLY TO  
ATTENTION OF:

August 11, 2004

Contracting Division  
A-E and Construction Branch

SUBJECT: DACA21-03-D-0013, Multiple Award Task Order Contract Construction and Design/Build for North Carolina (and SAD)

GSC Construction, Inc.  
314 Mann Road  
Waynesboro, Georgia 30830

Gentlemen:

You are requested to submit a price proposal for work detailed in the scope of work, drawings and specifications posted on our website. The Task Order Request Number is TONC10-03-D-0013. The title of the task order is Install Lightning Protection Systems, A/DAGG, Pope Air Force Base, North Carolina. The period of performance is 210 calendar days. Liquidated damages are \$563.20 per day.

This is a high priority requirement as defined in Army Federal Acquisition Regulation – AFAR Supplement 5101.602-2. Subject to availability of funds, the accounting classification will be: 21 4 2050 408 8021 P7000 3220 S09133. This project is also included in the financial plan for FY-05 at which time the accounting classification will be 21 5 2050 508 8021 P7000 3220 S09133. This statement is not a commitment of funds. Funds are not presently available for this acquisition. No contract award will be made until appropriated funds are made available from which payment for contract purposes can be made.

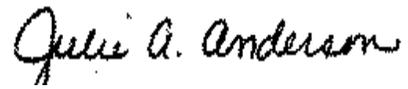
You are reminded that this project is being completed among your firm, The Clement Group, and TMS Contracting, LLC. Award will be made based on price.

To access the scope of work and specifications, and drawings go to <http://ebs.sas.usce.army.mil>. Scroll down the page to you come to the “blue” label that reads Construction – Simplified Acquisition. Select the project Number pertaining to your Solicitation/Contract TONC10-03-D-0013.

Your proposal should be signed by a duly authorized official of your company and is required no later than 2:00 P.M. local time August 26, 2004 to the above address ATTN: CT-C/Linda Elliott. You may fax your proposal to (912) 652-6001.

If you have any questions, please contact Linda Elliott at (912) 652-5076 or Charles Grainger at (912) 652-5642.

Sincerely,

A handwritten signature in black ink that reads "Julie A. Anderson". The signature is written in a cursive style with a large initial "J" and a distinct "A".

Julie A. Anderson  
Contracting Officer

Enclosures

**SCOPE OF WORK**  
**REVISED AUGUST 24, 2004**

TASK ORDER FOR CONSTRUCTION OF LIGHTNING PROTECTION SYSTEM A/DACG  
AREAS,  
FORT BRAGG, NORTH CAROLINA

- 1. DESCRIPTION OF WORK:** Furnish all labor, equipment, incidentals, supervision and transportation for work necessary to Lightning Protection System A/DACG Areas. All work shall be performed in accordance with the MATOC contract specifications, manufacturer's recommendations, and state building codes. All work shall comply with the Uniform Building Code, Life Safety Code, National Standard Plumbing Code and manufacturer's recommended practices. All electric work shall comply with NFPA 70, National Electric Code and NFPA 13 and 101, Life Safety Code and manufacturer's recommendations.
  
- 2. PERFORMANCE PERIOD:** 210 calendar days
  
- 3. CONTRACTOR REQUIREMENTS:**
  - A. Project Involves Handling of Asbestos: No
  - B. Occupancy During Construction: Yes
  - C. Phasing of Work: Yes, Section 01005
  - D. Construction Schedule: Bar Chart
  - E. CQC System Requirements: CQC Manager, Electrical QC, Submittal Clerk; Section 01451A
  
- 4. PRE-BID CONFERENCE:** No
  
- 5. CONTRACT REQUIREMENTS:**
  - A. After task order award:
    - FRP0001 - Site Safety and Health Plan
    - FRP0002 - Quality Control Program
    - FRP0003 - Work Plan (Design)
    - FRP0004 - Price Proposal
    - FRP0005 - Pre-Remediation Action Conference
    - FRP0006 - Work Schedule
    - FRP0007 - Weekly Progress Report
    - FRP0008 - Telephone Conversation/Correspondence Records
    - FRP0015 - Site/Project Specific Remediation Report

FRP0016 - As-Built/In Progress Drawings

B. After construction completion, prior to final payment:

FRP0010 - Operation and Maintenance Manuals

FRP0017 - As-Built/Final Drawings

**6. GOVERNMENT FURNISHED ITEMS/WORK:** N/A

**7. INTERFACE WITH GOVERNMENT PERSONNEL:** Access to and from the site shall be coordinated through the North Carolina Area Office.

**8. WAGE DETERMINATION:** NC030032 Building.

**9. LIQUIDATED DAMAGES:** The contractor shall be assessed the amount of \$563.20 liquidated damages per calendar day for failure to complete the prescribed work within the performance period stated in paragraph 2, above.

**10. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER:**

JA N	FE B	MA R	AP R	MA Y	JUN	JU L	AU G	SE P	OC T	NO V	DEC
10	9	6	4	4	6	8	7	4	4	5	9

**11. PAYMENT OFFICE:**

Pope Air Force Base Resident Office  
527 Interceptor Road  
Pope Air Force Base, North Carolina 28308

**12. ENCLOSURES:**

A. Specifications: 01005, 01330, 01420, 01451, 01500, 01780, 02315N, 02588N, 02761N, 02840A, 02982N, 13100A

B. Drawings: PWBC-6391

**13. PRE BID SITE VISIT:** Prior to the submission of any bids, all bidders are required to visit the project site location to become familiar with the project requirements. Failure to visit the project site will not disqualify a bid; however, the bidder is required to comply with the terms and conditions of any resultant contract by reason of such failure. In no event will a failure to inspect the site constitute grounds for a claim after award of the task order.

**14. EXCAVATION PERMIT:** The contractor shall have a completed and approved PWBC Excavation Permit prior to any excavation, to include sign or fence-post holes. The Contractor shall schedule an appointment to locate utility lines at least 5 days prior to any excavation with the PWBC Facilities

Maintenance Division. A copy of the PWBC Excavation Permit will be provided at the Prewrite Conference. The Contractor shall be responsible for coordination with the Information Technology Business Center (ITBC), Outside Plant Branch, for locating communication lines prior to any excavation.

**15. DISPOSAL AND BORROW PERMITS:**

- a. Disposal Permits: A permit is required to use the installation land clearing and inert debris and demolition landfills. Landfill permits shall be processed with the Environmental Compliance Branch of the PWBC Environmental & Natural Resources Division. Permits are issued for the life of the specific contract only. Only materials produced on the project for which the permits are issued may be disposed of in the land clearing and inert debris and demolition landfills. The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract disposal operation. Copies of the disposal permit forms will be provided at the Prewrite Conference.
- b. Borrow Permits: A permit is required to use the Fort Bragg borrow material pits. Borrow pit permits shall be processed with the Environmental Compliance Branch of the PWBC Environmental & Natural Resources Division. Permits are issued for the life of the specific contract only. Borrow materials may only be used on the project for which the permits are issued. The Contractor shall keep a copy of the completed permit with the vehicle throughout the contract borrow operation

**16. HAUL ROUTES:** The Contractor is required to obtain approval from the Resident Office for the routes he intends to use for transportation of borrow materials, construction debris, or demolition materials unless otherwise permitted in writing by the Resident. The axle load of earth-hauling equipment operating on paved streets shall not exceed 12,000 pounds.

**17. UTILITY OUTAGES AND ROAD CLOSURES:** Utility, road and railroad closures require a minimum 10 working days advance written notice and will be subject to Resident Office approval. In the case of a road closures, a sketch shall be provided showing the closure location and all necessary signs and barricades. Necessary signage, barricades, flag persons, lights (including temporary traffic control lights), and markings for the safe movement of the public during construction shall be in accordance with the Manual on Uniform Traffic Control Devices, and shall be provided at no additional expense to the Government.

**18. AVAILABILITY AND USE OF UTILITY SERVICES:** Utility services required on the job site for the accomplishment of the work will be furnished at no cost to the Contractor; however, the Government will make no connections or alterations to the existing utility systems for the Contractor. Utilities for

offices and/or storage buildings or areas will be billed to the Contractor monthly and will not be furnished free of charge. The Contractor shall be responsible for installing meters or other connections at no cost to the Government. At the conclusion of the contract, the Contractor shall remove all temporary connections, distribution lines, meters and associated paraphernalia unless otherwise directed by the Resident Office. Prior to installing any utility connections at an office/storage site, the plan will be approved by the Resident Office. When utility meters are installed, the Contractor shall notify the Resident Office for the initial meter reading. Failure to obtain this initial reading will result in the Contractor being charged for the entire amount shown on the meter.

- 19. CONTRACTOR STORAGE AND TRAILERS:** The Contractor shall place or paint a sign on all of his storage trailer(s) and building(s) used on this contract. At a minimum, the sign shall contain the name of the Contractor and a telephone number at which the contractor can be reached. The trailer(s) and building(s) shall be completed with gates and/or doors which can be locked. Only material for this project shall be stored in the trailer(s) or building(s). The Contractor shall remove the storage trailer(s) or building(s) within 30 days after completion of the contract and prior to submitting his final invoice. The area around the storage trailer(s) and building(s) shall be kept clean.
- 20. SAFETY:** Safety will be in compliance with the Corps of Engineers Safety Manual EM 185-11-1. Use of appropriate safety equipment is mandatory and not limited to hard hats and steel-toed shoes. Contractor is responsible for daily clean up and complete restoration of the area once the contract is complete.
- 21. HOURS OF WORK:** Work shall be accomplished between the hours of 0730 thru 1630 hours daily, Monday through Friday on non-Government holidays. Legal holidays falling on Saturday are observed on the preceding Friday and those falling on Sunday are observed on the following Monday. Work schedule and facility security to be coordinated with the Resident Office for facility access and security maintenance during duration of work. Contractor shall not work outside of the stated hours of work, without first obtaining approval from the Resident Office.
- 23. WARRANTY:** The contractor shall provide a minimum of one (1) year warranty on all materials and workmanship from the date of the Government's acceptance of the work.

End Scope of Work

**SECTION B  
SUPPLIES OR SERVICES AND PRICES/COSTS**

**SCHEDULE**

**LIGHTNING PROTECTION A/DACG  
FORT BRAGG, NORTH CAROLINA**

TOTAL BID (ITEM 1) ----- \$ \_\_\_\_\_

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	TOTAL
0001	Lightning Protection System at A/DACG, Complete	Job	L.S.	XXX X	_____ -



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WELDERS - receive rate prescribed for craft performing operation  
to which welding is incidental.  
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Unlisted classifications needed for work not included within  
the scope of the classifications listed may be added after  
award only as provided in the labor standards contract clauses  
(29 CFR 5.5(a)(1)(ii)).  
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In the listing above, the "SU" designation means that rates  
listed under that identifier do not reflect collectively

bargained wage and fringe benefit rates. Other designations  
indicate unions whose rates have been determined to be  
prevailing.

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can  
be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a  
position on a wage determination matter
- \* a conformance (additional classification and rate)  
ruling

On survey related matters, initial contact, including requests  
for summaries of surveys, should be with the Wage and Hour  
Regional Office for the area in which the survey was conducted  
because those Regional Offices have responsibility for the  
Davis-Bacon survey program. If the response from this initial  
contact is not satisfactory, then the process described in 2.)  
and 3.) should be followed.

With regard to any other matter not yet ripe for the formal  
process described here, initial contact should be with the Branch  
of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an  
interested party (those affected by the action) can request  
review and reconsideration from the Wage and Hour Administrator  
(See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U. S. Department of Labor  
200 Constitution Avenue, N. W.  
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.  
END OF GENERAL DECISION

PROJECT TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

01330 SUBMITTAL PROCEDURES  
01420 SOURCES FOR REFERENCE PUBLICATIONS  
01451A CONTRACTOR QUALITY CONTROL  
01500A TEMPORARY CONSTRUCTION FACILITIES  
01780A CLOSEOUT SUBMITTALS

DIVISION 02 - SITE CONSTRUCTION

02315N EXCAVATION AND FILL  
02588N CONCRETE POLES  
02761N PAVEMENT MARKINGS  
02840a VEHICLE BARRIERS/BOLLARDS  
02982N RESEALING OF JOINTS IN RIGID PAVEMENT

DIVISION 13 - SPECIAL CONSTRUCTION

13100A LIGHTNING PROTECTION SYSTEM

-- End of Project Table of Contents --

DOCUMENT 01005

GENERAL AND SPECIAL PROVISIONS

1. SCOPE OF WORK: The work consists of furnishing all labor, equipment, transportation, and materials necessary to perform all work in strict accordance with these specifications, schedules, applicable PWBC Drawings, and other contract documents. The scope of work of this contract includes, but is not limited to, the following specific items of work:
  - 1.1 Civil Work. At four pads identified as the Alert Holding Area (Pad #2), Call Forward Area (Pad #4), Ready Line (Pad #1), and Multi-Purpose Area (Pad #3).
    - 1.1.1 Auger eight (8) each, ten-foot deep holes in each of the four existing pads and place a 60-foot precast concrete pole in each hole.
    - 1.1.2 Backfill each hole with native soil and repair concrete and joints around base.
    - 1.1.3 Install four bollards around each pole.
  - 1.2 Architectural Work. None.
  - 1.3 Mechanical Work. None.
  - 1.4 Electrical Work. None.
    - 1.4.1 Install air terminals, overhead wire, grounding electrodes, test wells, and associated hardware between concrete poles to construct a continuous system to provide lightning protection for four locations identified as the Alert Holding Area (Pad #2), Call Forward Area (Pad #4), Ready Line (Pad #1) and Multi-Purpose Area (Pad #3).
  - 1.5 Landscaping and Grounds Restoration Work. None.
2. PROJECT REQUIREMENTS:
  - 2.1 Certificates of Compliance and Material Submittals. The Contractor shall submit for approval all certificates of compliance and material submittals required in these technical provisions. Required submittals shall be submitted for approval not later than 30 days prior to the approval date needed to achieve compliance with the approved project schedule. Approval must be received from the Contracting Officer or his representative before incorporating the materials into the work. The Contractor shall provide a Submittal Register listing all required submittals in the contract to the COR at the time of the first submittal. Submittal forms (form 59-2-R) and a sample Submittal Register (Form 4288) will be provided at the Prewrite Conference.
  - 2.2 Safety and Environmental Plans. Omitted
  - 2.3 Quality Control. The Contractor shall provide the job superintendent's name and telephone number to the Construction Management Division of the PWBC; building 3-1933, Butner Road; (910) 396-2308, prior to commencement of work. The Contractor shall furnish a daily Contractor

Quality Control (CQC)/Superintendent's work report to the Contracting Officer's Representative (COR). A sample CQC report form will be provided at the Prewrite Conference.

- 2.4 Excavation Permit. The Contractor shall have a completed and approved PWBC Excavation Permit in his possession prior to any excavation, to include sign or fence-post holes. The Contractor shall schedule an appointment to locate utility lines at least 10 working days prior to any excavation with the PWBC Facilities Maintenance Division, building 3-1634, Butner Road. This will be accomplished by submitting a Facilities Maintenance Division Service Order. Service Orders are obtained by calling (910) 396-0321, or making the request on-line at <http://www/bragg/army/mil/pwbc/>. Service Order status can also be checked on-line at the same web address. A copy of the PWBC Excavation Permit form will be provided at the Prewrite Conference. The Contractor shall be responsible for coordination with the Information Technology Business Center (ITBC), Outside Plant Branch; building 1-1434, Scott Street; (910) 396-8200, for locating government-owned communication lines prior to any excavation. The Contractor shall also be responsible for coordination with any known or suspected non-governmental utilities such as Sprint telecommunications or cable television.
- 2.5 Disposal and Borrow Permits.
- 2.5.1 Disposal Permits. Landfill disposal requirements are noted on Drawing Number PWBC-6391 T2.
- 2.5.2 Borrow Permits. Not applicable.
- 2.6 Haul Routes. The Contractor is required to use the haul routes shown on the contract drawings for transportation of borrow materials, construction debris, or demolition materials unless otherwise permitted in writing by the COR. When haul routes are not designated in the contract, the Contractor must obtain approval from the COR for the routes he intends to use. The axle load of earth-hauling equipment operating on paved streets shall not exceed 12,000 pounds.
- 2.7 Utility Outages and Road Closures. Utility, road, and railroad closures require minimum 10 working days advance written notice and will be subject to COR approval. A sample utility outage/road closure request form will be provided at the Prewrite Conference. Utility outages will be held on normal work days, after hours or on weekend/holidays as coordinated with the Contracting Officer, Ft. Bragg PWBC and the utility provider. The decision on when to have an outage (normal work hours, weekend, etc) will be based on the length of the outage and the normal business hours/hours of maximum usage for the facilities affected by the outage. Outages will be limited to a duration of 4 hours unless extenuating circumstances dictate otherwise.
- In the case of road closures, a sketch shall be provided showing the closure location and all necessary signs and barricades. Necessary signage, barricades, flagpersons, lights (including temporary traffic control lights), and markings for the safe movement of the public during construction shall be in accordance with the Manual on Uniform Traffic Control Devices, and shall be provided at no additional expense to the Government.
- 2.8 Availability and Use of Utility Services.

#### 2.8.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to and paid for by the Contractor at the prevailing rates. The rates listed below are current as of January 1, 2003 and are subject to change. The Contractor shall carefully conserve all utilities furnished.

#### 2.8.2 Meters and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, and meters required to measure the amount of each utility used for the purpose of determining charges. The Contractor shall notify the Contracting Officer's Representative, in writing, no less than 10 working days before the temporary connection is made. The Contracting Officer's Representative will then provide the contractor with the name and phone number of the utility provider. The contractor will be responsible for contacting the utility provider and making arrangements for connections and billing. For temporary electrical connections the Government or applicable utility provider will provide the meter (meter base provided by contractor) and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor shall not make the final electrical connection. For temporary water and sewer connections the contractor will provide the meter and after inspection/approval by the Contracting Officer's Representative make the final connection at the contractor's expense.

#### 2.8.3 Use of Permanent Building Utility Connections

Utilities consumed by the contractor from permanent building utility connections shall also be metered and paid for by the contractor. When the permanent system is activated the initial meter reading shall be recorded and reported as specified below. On building renovation projects the initial meter reading shall be recorded when the contractor is given possession of the building to perform the work. The contractor shall pay for utilities consumed through the permanent building connection until the work has been completed or the government has occupied the facility, whichever ever occurs first.

#### 2.8.4 Initial Meter Readings

Upon installation of the meter, the initial reading shall be recorded (in the presence of the Contracting Officer's Representative) and forwarded to the point of contact for utility service with a copy to the Contracting Officer's Representative.

#### 2.8.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, the Contractor shall notify the Contracting Officer and the applicable utility provider, in writing, 10 working days before termination is desired. The Government or applicable utility provider will take a final meter reading. Electric service will be disconnected

by the provider. Water and sewer connections will be disconnected by the contractor, at his expenses and by a method approved by the Contracting Officer's Representative. The Contractor shall then remove all the temporary distribution lines, meters, meter bases, and associated paraphernalia. The Contractor shall pay all outstanding utility bills before final acceptance of the work by the Government.

2.8.6 Requirement for backflow prevention on temporary/permanent potable water connections

The contractor shall install a backflow prevention device on all connections to the potable water system. The backflow prevention device shall be a reduced pressure or double check type, meeting all the State code requirements for backflow preventers on potable water. If the contractor request the use of a fire hydrant and receives approval from the Contracting Officer's Representative a backflow prevention device and meter shall be installed prior to each use.

2.8.7 Utilities Charge Rates

Water ----- \$1.9585 per 1,000 gallons  
Electricity ----- \$0.0752 per KW hour  
Sewer ----- \$10.00/month for each connected trailer up to single wide size.

The rate for larger trailers will be determined by the utility provider, however, this rate will not exceed \$20.00/month per trailer.

2.9 As-Built Record Drawings. The Contractor shall be responsible for maintaining one set of master prints at the job-site on which he shall keep a careful and neat record of all deviations from the original contract drawings as the work progresses. The Contractor shall note all changes and corrections on these record drawings promptly as the changes occur, but in no case less often than a weekly basis. In addition to incorporated modifications, these record drawings shall also include the actual location of all subsurface utility lines installed or encountered, and the type of materials used. Contractor will receive a copy of the contract documents in an electronic format (CD) at the time of award, the Contractor shall be responsible for transferring any as-built changes and plan sheet annotations described above onto the electronic format documents. The marked-up/annotated prints, or the annotated electronic drawings if applicable, shall be certified as to their correctness by an authorized representative of the Contractor and turned-over to the COR not later than 10 days after acceptance of the work by the Government.

2.10 Color Boards. Omitted.

3. SPECIAL PROVISIONS:

3.1 Occupancy. The facility will be unoccupied during accomplishment of the work. The Contractor shall provide not less than 30 days prior notice to the COR to allow evacuation of the affected area(s). Interference with and inconvenience to the occupants or routine use of the facility shall be held to an absolute minimum. The Contractor is responsible for providing such covering, shields, and barricades as are required to protect the facility, equipment, supplies, etc., from dust, debris, weather intrusion, or other cause of damage resulting from construction.

3.2 Contractor Vehicle/Equipment Access to Fort Bragg. Fort Bragg is not a closed installation but vehicular access is controlled. Contractors are required to register each vehicle that will be traveling installation roads or streets under its own power. Each such vehicle shall have a registration decal. Registration may be accomplished at the Main Vehicle Registration Center, building 8-1078 on Randolph Street near Bragg Boulevard, 0800-1700 hours Monday through Friday. Unregistered vehicles should expect to be stopped and delayed at all access control points. Contractors and all commercially registered vehicles shall use the Knox Street access control point off Bragg Boulevard for all access to Fort Bragg.

3.3 Special Work Constraints.

3.3.1 Phasing. (order of work by area, etc.)

3.3.1.1 Phase 1: Pad #1 and 3: All poles and hardware installed, tested and certified within ~~120~~140 calendar days of notice to proceed.

Phase 2: Pad #2 and 4: All poles and hardware installed, tested and certified within ~~60~~70 calendar days of completion of Phase I.

Special Note: Pads 1 and 4 cannot be under construct at the same time.

Contractor shall install and perform acceptance tests for each pad before being provided access to the next pad.

3.3.1.2 Contracting Officer may alter phasing priorities based on Government needs.

3.3.1.3 All work shall be complete within ~~180~~210 calendar days of notice to proceed.

3.3.2 Time Constraints. (limitation on time-of-day, specific dates, etc.)

3.3.2.1 Normal hours shall be between 8:00 am and 5:00 pm Monday through Friday, however, after house work must be requested to the contracting officer 72 hours in advance of the requested period.

3.3.2.2 Contractor's personnel shall wear company issued identification cards at all times.

3.3.3 Special Access Requirements.

3.3.3.1 None

3.3.4 Special Coordination Requirements.

3.3.4.1 None.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01330

SUBMITTAL PROCEDURES

09/01

PART 1 GENERAL

- 1.1 SUBMITTAL IDENTIFICATION (SD)
- 1.2 SUBMITTAL CLASSIFICATION
  - 1.2.1 Government Approved
  - 1.2.2 Information Only
- 1.3 APPROVED SUBMITTALS
- 1.4 DISAPPROVED SUBMITTALS
- 1.5 WITHHOLDING OF PAYMENT

PART 2 PRODUCTS (Not applicable)

PART 3 EXECUTION

- 3.1 GENERAL
- 3.2 SUBMITTAL REGISTER (ENG FORM 4288)
- 3.3 SCHEDULING
- 3.4 TRANSMITTAL FORM (ENG FORM 4025)
- 3.5 SUBMITTAL PROCEDURES
  - 3.5.1 Deviations
- 3.6 CONTROL OF SUBMITTALS
- 3.7 GOVERNMENT APPROVED SUBMITTALS
- 3.8 INFORMATION ONLY SUBMITTALS
- 3.9 STAMPS

-- End of Section Table of Contents --

SECTION 01330

SUBMITTAL PROCEDURES  
09/01

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION (SD)

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

SD-13 Certificates

SD-14 Samples

SD-18 Records

SD-19 Operation and Maintenance Manuals

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

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

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

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

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number

of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

#### 1.5 WITHHOLDING OF PAYMENT

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

#### PART 2 PRODUCTS (Not applicable)

#### PART 3 EXECUTION

##### 3.1 GENERAL

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

##### 3.2 SUBMITTAL REGISTER (ENG FORM 4288)

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

### 3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 21 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) attached to this section 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. 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 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. Two copies of the submittal will be retained by the Contracting Officer and three copies of the submittal will be returned to the Contractor.

### 3.8 INFORMATION ONLY SUBMITTALS

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

Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

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

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

-- End of Section --

**SUBMITTAL REGISTER**

CONTRACT NO.

TITLE AND LOCATION  
Install Lightning Protection System, A/DAGG

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01780A	SD-02 Shop Drawings As-Built Drawings	1.2.1													
		02315N	SD-02 Shop Drawings drawings														
		02588N	SD-05 Design Data mix design	1.3.3													
			SD-07 Certificates Quality control procedures	1.3.4													
		02761N	SD-03 Product Data Paints for roads and streets	2.1.1													
			SD-06 Test Reports Paints for roads and streets	2.1.1													
			SD-07 Certificates Paints for roads and streets	2.1.1													
			Construction equipment list	1.5													
			SD-08 Manufacturer's Instructions Paints for roads and streets	2.1.1													
		02840a	SD-02 Shop Drawings Installation PWBC	3.1	G												
		02982N	SD-03 Product Data Joint sealant	2.1.1													
			SD-04 Samples Joint filler	3.1.1													
			Separating tape	2.1.3.2													
			backer rod	2.1.3.1													



SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

**12/01**

PART 1 GENERAL

1.1 REFERENCES

1.2 ORDERING INFORMATION

-- End of Section Table of Contents --

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS  
12/01

PART 1 GENERAL

1.1 REFERENCES

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

1.2 ORDERING INFORMATION

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

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>  
AOK 5/01  
LOK 2/01

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  
Standards and Publications Fulfillment Center  
P. O. Box 1020  
Sewickley, PA 15143-9998  
Ph: 412-741-1979  
Fax: 412-741-0609  
Internet: <http://asa.aip.org>  
General e-mail: [asa@aip.org](mailto:asa@aip.org)  
Publications e-mail: [asapubs@abdintl.com](mailto:asapubs@abdintl.com)  
AOK 5/01

LOK 6/00

ASTM International (ASTM)  
100 Barr Harbor Drive  
West Conshohocken, PA 19428-2959  
Ph: 610-832-9585  
Fax: 610-832-9555  
Internet: <http://www.astm.org>  
AOK 5/01  
LOK 3/01

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)  
P.O. Box 5690  
Grandbury, TX 76049-0690  
Ph: 817-326-6300  
Fax: 817-326-6306  
Internet: <http://www.awpa.com>  
AOK 5/01  
LOK 3/01

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)  
445 Hoes Ln, P. O. Box 1331  
Piscataway, NJ 08855-1331  
Ph: 732-981-0060 OR 800-701-4333  
Fax: 732-981-9667  
Internet: <http://www.ieee.org>  
E-mail: [customer.services@ieee.org](mailto:customer.services@ieee.org)  
AOK 5/01  
LOK 6/00

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)  
P.O. Box 440  
South Yarmouth, MA 02664  
Ph: 508-394-4424  
Fax: 508-394-1194  
E-mail:  
Internet: <http://www.icea.net>  
AOK 5/01  
LOK 6/00

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)  
  
P.O. Box 687  
106 Stone Street  
Morrison, Colorado 80465  
PH: 303-697-8441  
FAX: 303-697-8431  
Internet: <http://www.netaworld.org>  
AOK 6/01

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)  
1300 N. 17th St., Suite 1847  
Rosslyn, VA 22209  
Ph: 703-841-3200  
Fax: 703-841-3300  
Internet: <http://www.nema.org/>  
AOK 5/01  
LOK 6/00

Install Lightning Protection System, A/DAGG  
FF-00049-3

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>  
AOK 5/01  
LOK 8/00

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)  
209 West Jackson Blvd.  
Chicago, IL 60606-6938  
Ph: 312-786-0300  
Fax: 312-786-0353  
Internet: <http://www.pci.org>  
e-mail: [info@pci.org](mailto:info@pci.org)  
AOK 5/01  
LOK 6/00

STATE OF NORTH CAROLINA ADMINISTRATIVE CODE

Internet: <http://www.doa.state.nc.us/PandC/admcode.htm>  
AOK 6/01  
LOK 0/00

UNDERWRITERS LABORATORIES (UL)  
333 Pfingsten Rd.  
Northbrook, IL 60062-2096  
Ph: 847-272-8800  
Fax: 847-272-8129  
Internet: <http://www.ul.com/>  
e-mail: [northbrook@us.ul.com](mailto:northbrook@us.ul.com)  
AOK 5/01  
LOK 6/00

U.S. DEPARTMENT OF AGRICULTURE (USDA)

Order AMS Publications from:  
AGRICULTURAL MARKETING SERVICE (AMS)  
Seed Regulatory and Testing Branch  
USDA, AMS, LS Div.  
Room 209, Bldg. 306, BARC-East  
Beltsville, MD 20705-2325  
Ph: 301-504-9430  
Fax: 301-504-8098  
Internet: <http://www.ams.usda.gov/nop/>  
e-mail: [jeri.irwin@usda.gov](mailto:jeri.irwin@usda.gov)

Order Other Publications from:  
U.S. Department of Agriculture  
14th and Independence Ave., SW, Room 4028-S  
Washington, DC 20250  
Ph: 202-720-2791  
Fax: 202-720-2166  
Internet: <http://www.usda.gov>  
AOK 5/01  
LOK 6/00

Install Lightning Protection System, A/DAGG  
FF-00049-3

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

Order from:  
General Services Administration  
Federal Supply Service Bureau  
470 E L'Enfant Plaza, S.W., Suite 8100  
Washington, DC 20407  
Ph: 202-619-8925  
Fx: 202-619-8978  
Internet: <http://www.fss.gsa.gov/pub/fed-specs.cfm>  
AOK 5/01  
LOK 6/00

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)  
700 Pennsylvania Avenue, N.W.  
Washington, D.C. 20408  
Phone: 800-234-8861  
Internet: <http://www.nara.gov>

Order documents from:  
Superintendent of Documents  
U.S. Government Printing Office  
732 North Capitol Street, NW  
Washington, DC 20401  
Mailstop: SDE  
Ph: 202-512-1530  
Fax: 202-512-1262  
Internet: <http://www.gpo.gov>  
E-mail: [gpoaccess@gpo.gov](mailto:gpoaccess@gpo.gov)  
AOK 5/01

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01451A

CONTRACTOR QUALITY CONTROL

01/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 PAYMENT

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

- 3.1 GENERAL REQUIREMENTS
- 3.2 QUALITY CONTROL PLAN
  - 3.2.1 General
  - 3.2.2 Content of the CQC Plan
  - 3.2.3 Acceptance of Plan
  - 3.2.4 Notification of Changes
- 3.3 COORDINATION MEETING
- 3.4 QUALITY CONTROL ORGANIZATION
  - 3.4.1 General
  - 3.4.2 CQC System Manager
  - 3.4.3 CQC Personnel
- 3.5 SUBMITTALS
- 3.6 CONTROL
  - 3.6.1 Preparatory Phase
  - 3.6.2 Initial Phase
  - 3.6.3 Follow-up Phase
  - 3.6.4 Additional Preparatory and Initial Phases
- 3.7 TESTS
  - 3.7.1 Testing Procedure
  - 3.7.2 Testing Laboratories
    - 3.7.2.1 Capability Check
    - 3.7.2.2 Capability Recheck
  - 3.7.3 Onsite Laboratory
  - 3.7.4 Furnishing or Transportation of Samples for Testing
- 3.8 COMPLETION INSPECTION
  - 3.8.1 Punch-Out Inspection
  - 3.8.2 Pre-Final Inspection
  - 3.8.3 Final Acceptance Inspection
- 3.9 DOCUMENTATION
- 3.10 NOTIFICATION OF NONCOMPLIANCE

-- End of Section Table of Contents --

SECTION 01451A

CONTRACTOR QUALITY CONTROL  
01/03

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 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	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

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

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

### 3.2 QUALITY CONTROL PLAN

#### 3.2.1 General

The contractor shall furnish for review by the Government, not later than 14 days after receipt of notice of proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 60 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of the 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 the CQC Plan or another interim plan containing the additional features of work to be started.

#### 3.2.2 Content of the CQC Plan

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

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities approved by the Contracting Officer shall be used.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

### 3.2.3 Acceptance of Plan

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

### 3.2.4 Notification of Changes

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

## 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, Postaward Conference, before start of design or 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 7 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 activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

## 3.4 QUALITY CONTROL ORGANIZATION

### 3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be

at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, ~~with~~ a minimum of ~~10~~<sup>15</sup> years construction experience on construction similar to this contract. 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 no other duties. 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: electrical, submittals clerk. These individuals shall be directly employed by the prime Contractor and may not be employed by a supplier or sub-contractor on this project; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

#### Experience Matrix

<u>Area</u>	<u>Qualifications</u>
a. Electrical	Graduate Electrical Engineer with 2 yrs experience in the type of work being performed or a technician with 5 yrs of related experience
b. Submittals	Submittal Clerk with 1 yr experience

### 3.5 SUBMITTALS

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 the construction 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
- 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 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 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 onsite, or any time acceptable specified quality standards are not being met.

### 3.6.3 Follow-up Phase

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

### 3.6.4 Additional Preparatory and Initial Phases

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

## 3.7 TESTS

### 3.7.1 Testing Procedure

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

laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

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

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

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

#### 3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$100.00 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 Onsite Laboratory

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

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

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.

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 Special Clause entitled "Commencement, Prosecution, and Completion of Work", or by 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 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. Offsite surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

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

### 3.10 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

Install Lightning Protection System, A/DAGG  
FF-00049-3

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 --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01500A

TEMPORARY CONSTRUCTION FACILITIES

02/97

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
  - 1.1.1 Site Plan
  - 1.1.2 Identification of Employees
  - 1.1.3 Employee Parking
- 1.2 AVAILABILITY AND USE OF UTILITY SERVICES
  - 1.2.1 Payment for Utility Services
  - 1.2.2 Meters and Temporary Connections
  - 1.2.3 Sanitation
  - 1.2.4 Telephone
- 1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN
  - 1.3.1 Bulletin Board
- 1.4 PROTECTION AND MAINTENANCE OF TRAFFIC
  - 1.4.1 Barricades
- 1.5 CONTRACTOR'S TEMPORARY FACILITIES
  - 1.5.1 Administrative Field Offices
  - 1.5.2 Storage Area
  - 1.5.3 Appearance of Trailers
  - 1.5.4 Maintenance of Storage Area
  - 1.5.5 Security Provisions
- 1.6 TEMPORARY PROJECT SAFETY FENCING
- 1.7 CLEANUP
- 1.8 RESTORATION OF STORAGE AREA

-- End of Section Table of Contents --

SECTION 01500A

TEMPORARY CONSTRUCTION FACILITIES  
02/97

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.1.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee, and for requiring each employee engaged on the work to display identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company's employee.

1.1.3 Employee Parking

Contractor employees shall park privately owned vehicles in only the designated equipment and supply staging area Contractor laydown area. Contractor employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2 AVAILABILITY AND USE OF UTILITY SERVICES

1.2.1 Payment for Utility Services

The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.

1.2.2 Meters and Temporary Connections

The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall provide and maintain necessary temporary connections, distribution lines, and meter bases required for execution of

this contract. The Contractor shall notify the Sandhills Utility Service, 910/497-7399, 5 working days before final electrical connection is desired. The Sandhills Utilities Service will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor shall not make the final electrical connection.

#### 1.2.3 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer.

Government toilet facilities will not be available to Contractor's personnel.

#### 1.2.4 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

### 1.3 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

#### 1.3.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

### 1.4 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations.

#### 1.4.1 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades

shall be securely placed, clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

## 1.5 CONTRACTOR'S TEMPORARY FACILITIES

### 1.5.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the equipment and supplies storage area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

### 1.5.2 Storage Area

The Contractor may construct a temporary 6 foot high chain link fence around trailers and materials. The fence shall include plastic strip inserts, colored [green] [brown], so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. Mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area at the end of each work day.

### 1.5.3 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

### 1.5.4 Maintenance of Storage Area

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

### 1.5.5 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.6 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the property of the Contractor and shall be removed from the work site.

1.7 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.8 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials, and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

PART 2 PRODUCTS (NOT ACCEPTABLE)  
PART 3 EXEUCION (NOT ACCEPTABLE)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01780A

CLOSEOUT SUBMITTALS

05/02

PART 1 GENERAL

- 1.1 SUBMITTALS
- 1.2 PROJECT RECORD DOCUMENTS
  - 1.2.1 As-Built Drawings
    - 1.2.1.1 Government Furnished Materials
    - 1.2.1.2 Working As-Built and Final As-Built Drawings
    - 1.2.1.3 Drawing Preparation
    - 1.2.1.4 Computer Aided Design and Drafting (CADD) Drawings
    - 1.2.1.5 Payment
  - 1.2.2 Real Property Equipment
- 1.3 OPERATION AND MAINTENANCE MANUALS
- 1.4 FINAL CLEANING

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section Table of Contents --

SECTION 01780A

CLOSEOUT SUBMITTALS  
05/02

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; GA

Drawings showing final as-built conditions of the project.

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 Government Furnished Materials

One set of CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

1.2.1.2 Working As-Built and Final As-Built Drawings

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

Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final as-built drawings 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 and final 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. 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.

#### 1.2.1.3 Drawing Preparation

The as-built 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, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer after approval by the Government. 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 and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, 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 graphic standards 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 the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. 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 required corrections, changes, additions, and deletions.

a. CADD colors shall be the "base" colors of red, green, and blue. Color code for changes shall be as follows:

(1) Deletions (red) - Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.

(2) Additions (Green) - Added items shall be drawn in green with green lettering in notes and leaders.

(3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes shall be in blue.

b. The Contract Drawing files shall be renamed in a manner related to the contract number (i.e., 98-C-10.DGN) as instructed in the Pre-Construction conference. Marked-up changes shall be made only to those renamed files. All changes shall be made on the layer/level as the original item. There shall be no deletions of existing lines; existing lines shall be over struck in red. Additions shall be in green with line weights the same as the drawing. Special notes shall be in blue on layer #63.

c. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of

the Contractor in letters at least 3/16 inch high. All other contract drawings shall be marked either "AS-Built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

d. Within 10 days after Government approval of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 7 days the Contractor shall revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 10 days the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disc, read-only memory (CD-ROM), one set of mylars, two sets of blue-line prints and one set of the approved working as-built drawings. 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 the customer's CADD system. 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

No separate payment will be made for as-built drawings required under this contract, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

#### 1.2.2 Real Property Equipment

The Contractor shall furnish a list of installed equipment furnished under this contract. The list shall include all information usually listed on manufacturer's name plate. The "EQUIPMENT-IN-PLACE LIST" shall include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished 30 days after transfer of the completed facility.

#### 1.3 OPERATION AND MAINTENANCE MANUALS

Operation manuals and maintenance manuals shall be submitted as specified. Operation manuals and maintenance manuals provided in a common volume shall be clearly differentiated and shall be separately indexed.

#### 1.4 FINAL CLEANING

The premises shall be left broom clean. Stains, foreign substances, and temporary labels shall be removed from surfaces. Paved areas shall be swept and landscaped areas shall be raked clean. The site shall have

Install Lightning Protection System, A/DAGG  
FF-00049-3

waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE CONSTRUCTION

SECTION 02315

EXCAVATION AND FILL

01/01

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 DEFINITIONS
  - 1.2.1 Hard Materials
  - 1.2.2 Rock
- 1.3 SUBMITTALS
- 1.4 DELIVERY, STORAGE, AND HANDLING
- 1.5 CRITERIA FOR BIDDING

PART 2 PRODUCTS

- 2.1 SOIL MATERIALS
  - 2.1.1 Common Fill

PART 3 EXECUTION

- 3.1 PROTECTION
  - 3.1.1 Drainage and Dewatering
    - 3.1.1.1 Dewatering
- 3.2 EXCAVATION
- 3.3 FILLING AND BACKFILLING
  - 3.3.1 Common Fill Placement
- 3.4 COMPACTION
- 3.5 FINISH OPERATIONS
  - 3.5.1 Grading
- 3.6 DISPOSITION OF SURPLUS MATERIAL

-- End of Section Table of Contents --

SECTION 02315

EXCAVATION AND FILL  
01/01

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698 (1991; R 1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m/m))

STATE OF NORTH CAROLINA ADMINISTRATIVE CODE

15A NCAC 2C Well Standards

1.2 DEFINITIONS

1.2.1 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.2 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding 1/2 cubic yard in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.3 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Supporting system drawings

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

## 1.5 CRITERIA FOR BIDDING

Base bids on the following criteria:

- a. Surface elevations are as indicated.
- b. Pipes or other artificial obstructions, except those indicated, will not be encountered.

## PART 2 PRODUCTS

### 2.1 SOIL MATERIALS

Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

#### 2.1.1 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

## PART 3 EXECUTION

### 3.1 PROTECTION

#### 3.1.1 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

##### 3.1.1.1 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 10-feet below the working level.

Operate dewatering system continuously until construction work below existing water levels is complete.

For the State of North Carolina, dewatering using well points is considered a well Contractor activity and must be performed or personally supervised by a North Carolina Certified Well Driller. Construction and abandonment must be performed in accordance with the North Carolina Administrative Code, Title 15A, Subchapter 2C (15A NCAC 2C) Well standards.

### 3.2 EXCAVATION

Excavate to elevation, and dimensions indicated. Reuse excavated

materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with native soil and compact to 95 percent of ASTM D 698 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with backfill and fill material

### 3.3 FILLING AND BACKFILLING

Fill and backfill to elevations and dimensions indicated. Compact each lift before placing overlaying lift.

#### 3.3.1 Common Fill Placement

Provide for general site. Place in 6 inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

### 3.4 COMPACTION

Expressed as a percentage of maximum density. Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

### 3.5 FINISH OPERATIONS

#### 3.5.1 Grading

Finish grades as indicated to match existing grade.

### 3.6 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber.

-- End of Section --

SECTION TABLE OF CONTENTS

DIVISION 02 - SITE CONSTRUCTION

SECTION 02588N

CONCRETE POLES

09/99

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 QUALITY ASSURANCE
  - 1.3.1 Concrete Poles
  - 1.3.2 Modification of References
  - 1.3.3 Design Requirement
  - 1.3.4 Certificates: Procedure Requirement

PART 2 PRODUCTS

- 2.1 CONCRETE
- 2.2 CEMENT
  - 2.2.1 Fly Ash and Pozzolan
  - 2.2.2 Ground Iron Blast-Furnace Slag
- 2.3 WATER
- 2.4 AGGREGATES
- 2.5 ADMIXTURES
- 2.6 REINFORCEMENT
  - 2.6.1 Reinforcing Bars
  - 2.6.2 Ties and Spirals
  - 2.6.3 Prestressing Steel

PART 3 EXECUTION

- 3.1 PREPARATION
- 3.2 INSTALLATION
  - 3.2.1 Pole Placement
    - 3.2.1.1 Augering
- 3.3 EXCAVATING, BACKFILLING, AND COMPACTING
- 3.4 PROTECTION OF POLES

-- End of Section Table of Contents --

SECTION 02588N

CONCRETE POLES  
09/99

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 211.1 (1991) Selecting Proportions for Normal, Heavyweight, and Mass Concrete

ACI 318/318M (1995) Building Code Requirements for Structural Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 82 (1995; Rev. A) Steel Wire, Plain, for Concrete Reinforcement

ASTM A 416/A 416M (1996) Steel Strand, Uncoated Seven-Wire for Prestressed Concrete

ASTM A 421 (1991) Uncoated Stress-Relieved Steel Wire for Prestressed Concrete

ASTM A 615/A 615M (1996; Rev. A) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM A 616/A 616M (1996; Rev. A) Rail-Steel Deformed and Plain Bars for Concrete Reinforcement

ASTM A 617/A 617M (1996; Rev. A) Axle-Steel Deformed and Plain Bars for Concrete Reinforcement

ASTM A 706/A 706M (1996; Rev. B) Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

ASTM C 33 (1993) Concrete Aggregates

ASTM C 150 (1997) Portland Cement

ASTM C 260 (1995) Air-Entraining Admixtures for Concrete

ASTM C 494 (1992) Chemical Admixtures for Concrete

ASTM C 595 (1994; Rev. A) Blended Hydraulic Cements

ASTM C 618 (1997) Coal Fly Ash and Raw or Calcined

Natural Pozzolan for Use as a Mineral  
Admixture in Concrete

ASTM C 989 (1995) Ground Granulated Blast-Furnace  
Slag for Use in Concrete and Mortars

PRECAST/PRESTRESSED CONCRETE INSTITUTE (PCI)

PCI MNL-116 (1985) Quality Control for Plants and  
Production of Precast Prestressed Concrete  
Products

PCI MNL-120 (1992) Design Handbook - Precast and  
Prestressed Concrete

Section 13100, "Lightning Protection System"

1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal  
Procedures."

SD-05 Design Data

Concrete mix design

SD-07 Certificates

Quality control procedures

1.3 QUALITY ASSURANCE

1.3.1 Concrete Poles

Provide precast concrete poles or precast prestressed poles for use in overhead distribution systems. Precast prestressed concrete poles or precast concrete poles shall be the product of a manufacturer specializing in the production of precast concrete members. Prestressed concrete poles shall be designed in accordance with PCI MNL-120 or precast concrete poles shall be designed with section properties equivalent to those of the prestressed concrete poles. Produce poles in one piece, and in accordance with PCI MNL-116.

1.3.2 Modification of References

In the ACI publications, consider the advisory provisions to be mandatory, as though the word "shall" had been substituted for "should" wherever it appears. Interpret references to the "building official," "Structural Engineer," and "Architect/Engineer" to mean the Contracting Officer.

1.3.3 Design Requirement

At least 30 calendar days prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials including type; brand; source and amount of cement, fly ash, pozzolan, ground slag, and admixtures; and applicable reference specification. Submit copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and is suitable for the job conditions. Furnish fly ash and pozzolan test

results performed within 6 months of submittal date. Obtain approval before concrete placement. An identical concrete mix design previously approved within the past 12 months by the Savannah District, US Army Corps of Engineers, may be used without further approval, if copies of the previous approval and fly ash and pozzolan test results are submitted. Obtain acknowledgement of receipt of test results prior to concrete placement. Submit additional data regarding concrete aggregates if the source of aggregate changes.

#### 1.3.4 Certificates: Procedure Requirement

Submit the precasting manufacturer's quality control procedures established in accordance with PCI MNL-116.

## PART 2 PRODUCTS

### 2.1 CONCRETE

ACI 211.1 or ACI 318/318M for Contractor furnished mix design for repairing concrete around base of poles. The minimum compressive strength of concrete at 28 days shall be 4000 psi unless otherwise indicated.

### 2.2 CEMENT

ASTM C 150, Type I, II, or III, or ASTM C 595, Type IP or IS blended cement, except as modified herein. The blended cement shall consist of a mixture of ASTM C 150 cement and one of the following materials: ASTM C 618 pozzolan or fly ash, or ASTM C 989 ground iron blast-furnace slag. The pozzolan or fly ash content shall not exceed 25 percent by weight of the total cementitious material and the ground iron blast-furnace slag shall not exceed 50 percent by weight of total cementitious material.

#### 2.2.1 Fly Ash and Pozzolan

ASTM C 618, Type N, F, or C, except that the maximum allowable loss on ignition shall be 6 percent for Types N and F.

#### 2.2.2 Ground Iron Blast-Furnace Slag

ASTM C 989, Grade 100 or 120.

### 2.3 WATER

Provide fresh, clean and potable water.

### 2.4 AGGREGATES

ASTM C 33, Size 57, 67, or 7. Aggregates shall not contain any substance which may be deleteriously reactive with the alkalies in the cement.

### 2.5 ADMIXTURES

ASTM C 494, except that air entraining shall conform to ASTM C 260.

### 2.6 REINFORCEMENT

#### 2.6.1 Reinforcing Bars

ASTM A 615/A 615M, Grade 60, ASTM A 617/A 617M Grade 60; ASTM A 616/A 616M

Install Lightning Protection System, A/DAGG  
FF-00049-3

Grade 60; or ASTM A 706/A 706M.

#### 2.6.2 Ties and Spirals

Steel, ASTM A 82.

#### 2.6.3 Prestressing Steel

Seven-wire stress-relieved strand conforming to ASTM A 416/A 416M or stress-relieved wire conforming to ASTM A 421, Type WA. The minimum ultimate strength shall be 250,000 psi. Prestressing steel shall be free from grease, oil, wax, paint, soil, dirt, loose rust, kinks, bends, or other defects.

### PART 3 EXECUTION

#### 3.1 PREPARATION

Prior to installation of poles, check for damage, such as cracking, spalling, and honeycombing. Reject members which contain honeycombed sections deep enough to expose reinforcing steel. Reject structurally impaired prestressed members. Provide a PCI MNL-116 commercial grade finish.

#### 3.2 INSTALLATION

##### 3.2.1 Pole Placement

##### 3.2.1.1 Augering

Poles shall be set in augered holes with a diameter 11.45 inches larger than the concrete pole. Fill augered hole around pole with compacted native soils containing no voids. Replace concrete at grade with air-entrained concrete having a minimum compressive strength of 4000 psi at 28 days and finish in a dome.

#### 3.3 EXCAVATING, BACKFILLING, AND COMPACTING

Provide as specified in Section 02315N, "Excavation and Fill."

#### 3.4 PROTECTION OF POLES

Take care to avoid damage to poles during handling.

-- End of Section --

SECTION TABLE OF CONTENTS  
DIVISION 02 - SITE CONSTRUCTION  
SECTION 02761N  
PAVEMENT MARKINGS

**8/02**

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY AND STORAGE
- 1.4 WEATHER LIMITATIONS
- 1.5 EQUIPMENT
  - 1.5.1 Paint Applicator

PART 2 PRODUCTS

- 2.1 MATERIALS
  - 2.1.1 Paints for Roads and Streets

PART 3 EXECUTION

- 3.1 SURFACE PREPARATION
- 3.2 APPLICATION
  - 3.2.1 Rate of Application
    - 3.2.1.1 Nonreflective Markings
  - 3.2.2 Painting
- 3.3 TRAFFIC CONTROL AND PROTECTION

-- End of Section Table of Contents --

SECTION 02761N

PAVEMENT MARKINGS

8/02

PART 1 GENERAL

1.1 REFERENCES

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

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS TT-P-1952 (1994; 2000; Rev. D) Paint, Traffic and  
Airfield Markings, Water Emulsion Base

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-03 Product Data

Paints for roads and streets

SD-06 Test Reports

Paints for roads and streets

Report from sampling and testing made in accordance with paragraph entitled "Sampling and Testing."

SD-07 Certificates

Paints for roads and streets

Construction equipment list

SD-08 Manufacturer's Instructions

Paints for roads and streets

Submit manufacturer's Material Safety Data Sheets.

1.3 DELIVERY AND STORAGE

Deliver paints and paint materials in original sealed containers that plainly show the designated name, specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer. Provide storage facilities at the job site for maintaining

materials at temperatures recommended by the manufacturer.

#### 1.4 WEATHER LIMITATIONS

Apply paint to clean, dry surfaces, and unless otherwise approved, only when air and pavement temperatures are above 40 degrees F and less than 95 degrees F for oil-based materials; above 50 degrees F and less than 110 degrees F for water-based materials. Maintain paint temperature within these same limits.

#### 1.5 EQUIPMENT

Machines, tools, and equipment used in the performance of the work shall be approved by the Contracting Officer and maintained in satisfactory operating condition. Submit construction equipment list approval by the Contracting Officer.

##### 1.5.1 Paint Applicator

Provide hand-operated push-type applicator machine of a type commonly used for application of paint to pavement surfaces. Paint applicator machine shall be acceptable for marking small street and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

Provide materials conforming to the requirements specified herein.

##### 2.1.1 Paints for Roads and Streets

FS TT-P-1952, color as indicated.

### PART 3 EXECUTION

#### 3.1 SURFACE PREPARATION

Allow new pavement surfaces to cure for a period of not less than 30 days before application of marking materials. Thoroughly clean surfaces to be marked before application of the paint. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods as required.

#### 3.2 APPLICATION

##### 3.2.1 Rate of Application

###### 3.2.1.1 Nonreflective Markings

Apply paint evenly to the pavement surface to be coated at a rate of 105 plus or minus 5 square feet per gallon.

##### 3.2.2 Painting

Apply paint with approved equipment at rate of coverage specified herein.

Provide guidelines and templates as necessary to control paint application. Take special precautions in marking numbers, letters, and symbols. Manually paint numbers, letters, and symbols. Sharply outline all edges of markings. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. Discontinue painting operations if there is a deficiency in drying of the markings until cause of the slow drying is determined and corrected.

### 3.3 TRAFFIC CONTROL AND PROTECTION

Place warning signs near the beginning of the work site and well ahead of the work site for alerting approaching traffic from both directions. Place small markers along newly painted lines to control traffic and prevent damage to newly painted surfaces. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines. -- End of Section --

Install Lightning Protection System, A/DAGG  
FF-00049-3

lines.           -- End of Section --

SECTION TABLE OF CONTENTS  
DIVISION 02 - SITE CONSTRUCTION  
SECTION 02840A  
VEHICLE BARRIERS/BOLLARDS

**02/02**

PART 1 GENERAL

- 1.1 GENERAL REQUIREMENTS
- 1.2 SUBMITTALS

PART 2 PRODUCTS

- 2.1 FIXED BOLLARDS
- 2.2 FINISH

PART 3 EXECUTION

- 3.1 INSTALLATION

-- End of Section Table of Contents --

SECTION 02840A

VEHICLE BARRIERS/BOLLARDS  
02/02

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

Bollards installed shall be as shown on the Contract Drawing Number PWBC-6391, Sheet D2, Detail 6.

1.2 SUBMITTALS

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

SD-02 Shop Drawings

Installation; G, PWBC

Detail drawings and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and relationship to other parts of the work including foundation and clearances for maintenance and operation.

PART 2 PRODUCTS

2.1 FIXED BOLLARDS

The total bollard height shall be no less than 48 inches above the surface and shall have an outside diameter of no less than 8 inches. A bollard system shall consist of a minimum of 4 bollards spaced no more than 48 inches from centerline to centerline of bollards around each concrete pole.

2.2 FINISH

Bollards shall have 4 each 2 inch wide reflective orange stripes 2 inches apart painted with FS TT-P-1952 orange paint as shown on Drawings PWBC-6391, Detail 6/D2.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with Drawing Number PWBC-6391, Detail 6/D2.

-- End of Section --

SECTION TABLE OF CONTENTS  
DIVISION 02 - SITE CONSTRUCTION  
SECTION 02982N  
RESEALING OF JOINTS IN RIGID PAVEMENT  
09/99

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 DELIVERY, STORAGE, AND HANDLING
- 1.4 ENVIRONMENTAL REQUIREMENTS
- 1.5 TRAFFIC CONTROL
- 1.6 EQUIPMENT
  - 1.6.1 Joint Cleaning Equipment
    - 1.6.1.1 Routing Tool
    - 1.6.1.2 Concrete Saw
    - 1.6.1.3 Sandblasting Equipment
    - 1.6.1.4 Air Compressor
    - 1.6.1.5 Vacuum Sweeper
    - 1.6.1.6 Hand Tools
  - 1.6.2 Joint Sealing Equipment
    - 1.6.2.1 Hot-Poured Liquid Sealant
    - 1.6.2.2 Two-Component Cold-Applied Liquid Sealants
    - 1.6.2.3 Equipment for Silicone Sealant
- 1.7 SAFETY PROVISIONS

PART 2 PRODUCTS

- 2.1 MATERIALS
  - 2.1.1 Joint Sealant
    - 2.1.1.1 Sealant, Joint, Jet-Fuel Resistant, Hot-Applied
  - 2.1.2 Primers
  - 2.1.3 Bond Breakers
    - 2.1.3.1 Blocking Media
    - 2.1.3.2 Separating Tape

PART 3 EXECUTION

- 3.1 JOINT PREPARATION
  - 3.1.1 Removal of Existing Material
  - 3.1.2 Bond Breaker
    - 3.1.2.1 Blocking Media (Backer Rod) (Except for Expansion Joints)
    - 3.1.2.2 Separating Tape
  - 3.1.3 Rate of Progress
  - 3.1.4 Disposal of Debris
- 3.2 PREPARATION OF SEALANT
  - 3.2.1 Hot-Poured Type
- 3.3 INSTALLATION OF SEALANT
  - 3.3.1 Time of Application
  - 3.3.2 Sealing the Joints
- 3.4 FIELD QUALITY CONTROL

Install Lightning Protection System, A/DAGG  
FF-00049-3

- 3.4.1 Joints
- 3.4.2 Joint Sealer
- 3.5 ACCEPTANCE

-- End of Section Table of Contents --

SECTION 02982N

RESEALING OF JOINTS IN RIGID PAVEMENT  
09/99

PART 1 GENERAL

1.1 REFERENCES

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

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

- |              |  |
|--------------|--|
| FS SS-S-200  | (Rev. E; Am. 2) Sealants, Joint, Two-Component, Jet-Blast Resistant, Cold-Applied, For Portland Cement Concrete Pavement |
| FS SS-S-1614 | (Rev. A) Sealants, Joint, Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Tar Concrete Pavements                |

1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-03 Product Data

Joint sealant

Submit catalog cuts, specifications, material Safety Data Sheets and other information documenting conformance to contract requirements.

SD-04 Samples

Joint filler

Separating tape

Joint backer rod

Joint sealant

Factory test report

Name of sealant

Identification of component, or primer

Specification number and type

Manufacturer's name

Manufacturer's lot and batch number

Date of Manufacture (month and year)

Shelf life retest date (month and year)

List of hazardous components

Quantity of material in container (volume)

Storage instructions

Instructions for use

#### SD-07 Certificates

Equipment list

#### SD-08 Manufacturer's Instructions

Joint sealant

Instructions shall include, but not be limited to: storage requirements, ambient temperature and humidity ranges, and moisture condition of joints for successful installation; requirements for preparation of joints; safe heating temperature; mixing instructions; installation equipment and procedures; application and disposal requirements; compatibility of sealant with filler material; curing requirements; and restrictions to be adhered to in order to reduce hazards to personnel or to the environment. Submit instructions at least 30 days prior to use.

### 1.3 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the site for visible damage, and unload and store with a minimum of handling. Joint materials shall be delivered in original sealed containers and shall be protected from freezing or overheating. Provide jobsite storage facilities capable of maintaining temperature ranges within manufacturers recommendations.

### 1.4 ENVIRONMENTAL REQUIREMENTS

Work shall not proceed when weather conditions detrimentally affect the quality of cleaning joints or applying joint sealants. Joint preparation and sealing shall proceed only when weather conditions are in accordance with manufacturer's instructions. During installation, surfaces shall be dry and sealant and bond breakers shall be protected from moisture.

### 1.5 TRAFFIC CONTROL

Do not permit vehicular or heavy equipment traffic on the pavement in the area of the joints being sealed during the protection and curing period of the joint sealant. At the end of the curing period, traffic may be permitted on the pavement when approved.

### 1.6 EQUIPMENT

Submit a equipment list and description of the equipment to be used and a statement from the supplier of the joint sealant that the proposed

equipment is acceptable for installing the specified sealant. Equipment for heating, mixing, and installing joint seals shall be in accordance with the instructions provided by the joint seal manufacturer. Furnish equipment, tools, and accessories necessary to clean existing joints and install liquid joint sealants. Maintain machines, tools, and other equipment in proper working condition.

#### 1.6.1 Joint Cleaning Equipment

##### 1.6.1.1 Routing Tool

To remove old sealant from joints, select rectangular shaped routing tool that is adjustable to varying widths and depths required. The equipment shall be capable of maintaining accurate cutting depth and width control. The joint plow shall be equipped with a spring or hydraulic mechanism to release pressure on the tool prior to spalling the concrete.

##### 1.6.1.2 Concrete Saw

Self-propelled power saw with diamond saw blades designed for sawing, refacing, widening, or deepening existing joints as specified without damaging the sides, bottom, or top edge of joints. Blades may be single or gang type with one or more blades mounted in tandem for fast cutting. Select saw adequately powered and sized to cut specified opening with not more than two passes of the saw through the joint.

##### 1.6.1.3 Sandblasting Equipment

Commercial type capable of removing residual sealer, oil, or other foreign material. Equipment shall include an air compressor, hose and nozzles of proper size, shape, and opening. Attach an adjustable guide that will hold the nozzles aligned with the joint to effectively and efficiently clean without damage to concrete edges. Adjust height, angle of inclination, or size of nozzles to sandblast joint faces and not bottom of joint.

##### 1.6.1.4 Air Compressor

Portable air compressor capable of operating the sandblasting equipment and capable of blowing out sand, water, dust adhering to sidewalls of concrete, and other objectionable materials from the joints. The compressor shall furnish air at a pressure not less than 90 psi and a minimum rate of 150 cubic feet of air per minute at the nozzles and free of oil.

##### 1.6.1.5 Vacuum Sweeper

Self-propelled, vacuum pickup sweeper capable of completely removing loose sand, water, joint material, and debris from pavement surface.

##### 1.6.1.6 Hand Tools

When approved, hand tools such as brooms and chisels may be used in small areas for removing old sealant from joints and repairing or cleaning the joint faces.

#### 1.6.2 Joint Sealing Equipment

Joint sealing equipment shall be of a type required by the joint seal manufacturer's installation instructions. Equipment shall be capable of installing sealant to the depths, widths and tolerances indicated. When

malfunctions are noted, joint sealing shall not proceed until they are corrected.

#### 1.6.2.1 Hot-Poured Liquid Sealant

Install hot-poured sealant materials with unit applicators which will heat and extrude the sealant. Equip the mobile units with double-wall agitator type kettles with an oil medium in the outer space for heat transfer, a direct-connected pressure-type extruding device with nozzles shaped for insertion in the joints to be filled, and a positive device for controlling the temperature of oil and sealer. Design the applicator so that the sealant will circulate through the delivery hose and return to the kettle when not sealing a joint. Insulate the applicator wand from the kettle to the nozzle. Select dimensions of the nozzles such that the tip of the nozzle will easily feed sealant into the void space of the joint. Equip the nozzle tip with a metal cross-bar to ensure that the top of the sealant fed into the joint is level and within the indicated tolerance below the pavement surface.

#### 1.6.2.2 Two-Component Cold-Applied Liquid Sealants

For two component cold applied machine mixed sealants the equipment shall be capable of delivering each component within an accuracy of 5 percent. Equip reservoirs for each component with mechanical agitation devices. Equip equipment with thermostatically controlled indirect heating of components when required. Equipment shall include screens over each reservoir to eliminate foreign particles or partially polymerized material which may clog lines. Equipment shall be capable of intimately mixing the two components through a range of application rates from 10 to 60 gallons per hour and through a range of pressures from 50 to 150 pounds per square inch. Hand-mixing of cold-applied two component sealant may be done at the option of the Contractor for sealants conforming to FS SS-S-200, Type H.

#### 1.6.2.3 Equipment for Silicone Sealant

Equipment for silicone sealant shall be air powered pump, components, and hoses as recommended by the sealant manufacturer. Hoses and seals shall be lined to prevent moisture penetration and withstand pumping pressures. Equipment shall be free of contamination from previously used or other type sealant.

### 1.7 SAFETY PROVISIONS

In accordance with the provisions of the contract respecting "Accident Prevention," the Contractor shall take appropriate measures to control worker exposure to toxic substances during the work. Provide personnel protective equipment as required. Material Safety Data Sheets (Department of Labor Form OSHA-20 or comparable form) shall be available on the site.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- 2.1.1 Joint Sealant
- 2.1.1.1 Sealant, Joint, Jet-Fuel Resistant, Hot-Applied  
FS SS-S-1614, for portland cement and tar concrete pavements.

### 2.1.2 Primers

Select concrete primer recommended by the manufacturer of the proposed liquid joint sealant.

### 2.1.3 Bond Breakers

#### 2.1.3.1 Blocking Media

Compressible, nonshrinkable, nonreactive with joint sealant and nonabsorption type such as plastic backer rod, free of oils or bitumens. Blocking media shall be consistent with the joint seal manufacturer's installation instructions and be at least 25 percent larger in diameter than the width of the cleaned and re-faced joints as shown.

#### 2.1.3.2 Separating Tape

Polyethylene or polyester tape, 3 mil minimum thickness, or masking tape, nonreactive, nonabsorptive, adhesive-back tape, width equal to width of cleaned and refaced joints as indicated. Separating tape shall be consistent with the joint seal manufacturer's installation instructions.

## PART 3 EXECUTION

### 3.1 JOINT PREPARATION

Unless otherwise indicated, remove existing material, saw, clean and reseal joints. Do not proceed with final cleaning operations by more than one working day in advance of sealant. Thoroughly clean joints by removing existing joint sealing compound, bond-breakers, dirt, and other foreign material with the equipment specified herein, but not limited thereto. Cleaning procedures which damage joints or previously repaired patches by chipping or spalling will not be permitted. Remove existing sealant to the required depth as indicated. Precise shape and size of existing joints vary, and conditions of joint walls and edges vary and include but are not limited to rounding, square edges, sloping, chips, voids, depressions, and projections.

#### 3.1.1 Removal of Existing Material

Remove from the joint the existing sealants by using the specified routing tool. After cutting free the existing sealant from both joint faces, remove sealant to the depth required to accommodate the bond breaking material and to maintain the specified depth for the new sealant. For expansion joints, remove existing sealant to a depth of not less than one times the width. When existing preformed expansion-joint material is more than one inch below the surface of the pavement, remove existing sealant to the top of the preformed joint filler. For joints other than expansion joints, remove in-place sealant to the depth as indicated. At the completion of routing operations, clean pavement surface with vacuum sweeper and clean the joint opening by blowing with compressed air. Protect previously cleaned joints from being contaminated by subsequent cleaning operations.

#### 3.1.2 Bond Breaker

At the time the joints receive the final cleaning and are dry, install bond breaker material as indicated with a steel wheel or other approved device.

3.1.2.1 Blocking Media (Backer Rod) (Except for Expansion Joints)

Plug or seal off the lower portion of the groove by installing the specified blocking media as indicated.

3.1.2.2 Separating Tape

Insert the specified tape as indicated.

3.1.3 Rate of Progress

The final stages of joint preparation, which include placement of bond breakers, if required, shall be limited to only that length of joint that can be resealed during the same workday.

3.1.4 Disposal of Debris

Sweep from pavement surface to remove excess joint material, dirt, water, sand, and other debris by vacuum sweepers or hand brooms. Remove the debris immediately to a point off station.

3.2 PREPARATION OF SEALANT

3.2.1 Hot-Poured Type

Heat hot-poured sealing materials in accordance with safe heating temperature ranges recommended by the manufacturer. Withdraw and waste sealant that has been overheated or subjected to heating for over 3 hours or that remain in the applicator at the end of the day's operation. Heat sealant in specified equipment.

3.3 INSTALLATION OF SEALANT

3.3.1 Time of Application

After approval of the test section, seal joints immediately following final cleaning and placing of bond breakers. Commence sealing joints when walls are dust free and dry, and when weather conditions meet joint seal manufacturer's instructions. If the above conditions cannot be met, or when rains interrupts sealing operations, reclean and permit the joints to dry prior to installing the sealant.

3.3.2 Sealing the Joints

Install bond breaker just prior to pouring sealant. Fill the joints with sealant from bottom up until joints are uniformly filled solid from bottom to top using the specified equipment for the type of sealant required. Fill joints to 1/4 inch below top of pavement within tolerances as indicated, and without formation of voids or entrapped air. Except as otherwise permitted, tool the sealant immediately after application to provide firm contact with the joint walls and to form the indicated sealant profile below the pavement surface. Remove excess sealant that has been inadvertently spilled on the pavement surface. Check sealed joints frequently to assure that newly installed sealant is cured to a tack-free condition within 3 hours. Protect new sealant from rain during curing period.

3.4 FIELD QUALITY CONTROL

3.4.1 Joints

Inspect and approve joints which have been cleaned and have backer rods or bond breaking tape installed prior to sealing.

3.4.2 Joint Sealer

Inspect installed joint seals for conformance to contract requirements and joint seal manufacturer's instructions.

3.5 ACCEPTANCE

Reject joint sealer that fails to cure properly, or fails to bond to joint walls, or reverts to the uncured state, or fails in cohesion, or shows excessive air voids, blisters, surface defects, swelling, or other deficiencies, or is not properly recessed within indicated tolerances. Remove rejected sealer and reclean and reseal joints in accordance with the specification. Perform removal and reseal work promptly by and at the expense of the Contractor.

-- End of Section --

SECTION TABLE OF CONTENTS  
DIVISION 13 - SPECIAL CONSTRUCTION  
SECTION 13100A  
LIGHTNING PROTECTION SYSTEM  
07/01

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 GENERAL REQUIREMENTS
  - 1.2.1 Verification of Dimensions
  - 1.2.2 System Requirements
- 1.3 SUBMITTALS

PART 2 PRODUCTS

- 2.1 MATERIALS
  - 2.1.1 General Requirements
  - 2.1.2 Main and Secondary Conductors
    - 2.1.2.1 Aerial Conductors
  - 2.1.3 Air Terminals
  - 2.1.4 Ground Electrodes
  - 2.1.5 Connectors
  - 2.1.6 Lightning Protection Components
  - 2.1.7 Hardware
  - 2.1.8 Insulators
  - 2.1.9 Test/Inspection Wells

PART 3 EXECUTION

- 3.1 CATENARY SYSTEM
  - 3.1.1 General Requirements
    - 3.1.1.1 Air Terminals
    - 3.1.1.2 Aerial Conductors
    - 3.1.1.3 Down Conductors
    - 3.1.1.4 Grounding Electrodes
  - 3.1.2 Concrete Poles
- 3.2 INSPECTION & TESTING

-- End of Section Table of Contents --

SECTION 13100A

LIGHTNING PROTECTION SYSTEM  
07/01

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

- |                   |  |
|-------------------|--|
| ASTM A 153/A 153M | (2003) Zinc Coating (Hot-Dip) on Iron and Steel Hardware         |
| ASTM A 575        | (1996; R 2002) Steel Bars, Carbon, Merchant Quality, M-Grades    |
| ASTM A 576        | (1990b; R 2000) Steel Bars, Carbon, Hot-Wrought, Special Quality |

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- |              |   |
|--------------|---|
| IEEE C135.1  | (1999) Zinc Coated Steel Bolts and Nuts for Overhead Line Construction                              |
| IEEE C135.2  | (1999) Threaded Zinc-Coated Ferrous Strand-Eye Anchor Rods and Nuts for Overhead Line Construction  |
| IEEE C135.22 | (1988) Zinc-Coated Ferrous Pole-Top Insulator Pins with Lead Threads for Overhead Line Construction |

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

- |            |  |
|------------|--|
| NEMA C29.3 | (1986; R 2002) Wet Process Porcelain Insulators - Spool Type |
|------------|--|

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- |          |   |
|----------|---|
| NFPA 780 | (2000) Installation of Lightning Protection Systems |
|----------|---|

UNDERWRITERS LABORATORIES (UL)

- |        |   |
|--------|---|
| UL 96  | (1994; Rev thru Jan 2000) Lightning Protection Components         |
| UL 96A | (2001) Installation Requirements for Lightning Protection Systems |
| UL 467 | (1993; Rev thru Feb 2001) Grounding and                           |

## Bonding Equipment

### 1.2 GENERAL REQUIREMENTS

#### 1.2.1 Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work. No departures shall be made without the prior approval of the Contracting Officer.

#### 1.2.2 System Requirements

The system furnished under this specification shall consist of the standard products of a manufacturer regularly engaged in the production of lightning protection systems. The lightning protection system shall conform to NFPA 780, UL 96 and UL 96A, except where requirements in excess thereof are specified herein.

### 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

##### Drawings; Information only

Detail drawings consisting of a complete list of material, including manufacturer's descriptive and technical literature, catalog cuts, drawings, and installation instructions. Detail drawings shall demonstrate that the system has been coordinated and will function as a unit. Drawings shall show proposed layout and mounting and relationship to other parts of the work.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 General Requirements

No combination of materials shall be used that form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture unless moisture is permanently excluded from the junction of such metals. Where unusual conditions exist which would cause corrosion of conductors, conductors with protective coatings or oversize conductors shall be used. Where a mechanical hazard is involved, the conductor size shall be increased to compensate for the hazard or the conductors shall be protected by covering them with molding or tubing made of wood or nonmagnetic material. When metallic conduit or tubing is used, the conductor shall be electrically connected at the upper and lower ends.

## 2.1.2 Main and Secondary Conductors

Conductors shall be in accordance with NFPA 780 and UL 96 for Class I materials as applicable, except where requirements in excess thereof or specified herein..

### 2.1.2.1 Aerial Conductors

Shall be copper conductors not smaller than No. 4/0 AWG.

Aerial conductors shall be #1/0 AWG, concentric lay soft-drawn copper, 19 strand, with a minimum breaking strength of not less than 2155 kg (4752 lbs). Down conductors interior to concrete poles shall be #4/0 AWG.

### 2.1.3 Air Terminals

Terminals shall be in accordance with UL 96 and NFPA 780, nominal 3/8" in diameter and 48" in length with tapered top. Down conductors shall be Class II lightning conductors, rope by copper, with 28 strands of 14 AWG wire, and a nominal 115 kemil cross sectional area..

### 2.1.4 Ground Electrodes

Provide ground electrodes made of solid copper rods conforming to UL 467. Provide rods that are not less than 3/4 inch in diameter and 20 feet in length. Remote test well probes (ground rods) shall be no less than 3/4 inch diameter and 10 feet in length.

### 2.1.5 Connectors

All permanent connections, bonds, and splices shall be done by exothermic welds or by high compression fittings. The exothermic welds and high compression fittings shall be listed for the purpose. The high compression fittings shall be the type which require a hydraulically operated mechanism to apply a minimum of 10,000 psi. Connections requiring disassembly for inspection, maintenance, and testing shall be made with two-bolt parallel cable splicer, split bolt connectors, or similar removable device.

### 2.1.6 Lightning Protection Components

Lightning protection components, such as bonding plates, air terminal supports, clips, and fasteners shall conform to UL 96, classes as applicable.

### 2.1.7 Hardware

Hardware shall be hot-dip galvanized in accordance with ASTM A 153/A 153M.

Zinc-coated hardware shall comply with IEEE C135.1, IEEE C135.2, IEEE C135.22.

Steel hardware shall comply with ASTM A 575 and ASTM A 576. Hardware applied to compression lugs shall be stainless A 410. Pole-line hardware shall be hot-dip galvanized steel. Washers shall be installed under boltheads and nuts as required. Washers used on through-bolts and double-arming bolts shall be approximately 2-1/4 inches square and 3/16 inch thick. The diameter of holes in washers shall be the correct standard size for the bolt on which a washer is used. Washers for use under heads of carriage-bolts shall be of the proper size to fit over square shanks of bolts. Shims and clevises shall be used wherever required to support and to protect poles, and insulators.

#### 2.1.8 Insulators

Provide wet-process porcelain insulators which are radio interference free.

- a) Spool insulators: NEMA C29.3, Class 53-2.

#### 2.1.9 Test/Inspection Wells

Test/Inspection wells shall be approximately 12" x 12" x 24" deep, of polymeric concrete construction meeting WUC 3.6 recommendations for 10,000 lbs traffic loading. Cover shall have non-skid texture with bolt down feature.

### PART 3 EXECUTION

#### 3.1 CATENARY SYSTEM

##### 3.1.1 General Requirements

The lightning protection system shall consist of a central aerial conductor, air terminals, down conductors, ground connections, and ground electrodes, electrically interconnected to form the shortest distance to ground. All conductors on the structures shall be exposed except where conductors are cast in a pole structure. All conductors at connection points shall be thoroughly cleaned of all corrosion prior to permanent connections being made. All conductors with exposed ends after termination shall be wrapped with #18 wire and tinned.

##### 3.1.1.1 Air Terminals

Air terminal design and support shall be in accordance with NFPA 780. Terminals shall be rigidly connected to, and made electrically continuous with, conductors by means of pressure connectors and connected to the air terminal by a threaded fitting.

##### 3.1.1.2 Aerial Conductors

Sharp bends or turns in conductors shall be avoided. Necessary turns shall have a radius of not less than 8 inches. Conductors shall preserve a downward or horizontal course.

##### 3.1.1.3 Down Conductors

Down conductors shall be continuous and unbroken from air terminals to grounding electrodes. One down conductor shall be in the concrete poles in manufacturer with five foot service loop at both ends. Each pole shall have 5'-0" outside of pole.

##### 3.1.1.4 Grounding Electrodes

Provide grounding electrode for each down conductors. Extend driven ground rods into the existing undisturbed earth for a distance of not less 10 feet. Set ground rods not less than 2 feet from the structure. After the completed installation, measure the total resistance to ground using the fall-of-potential method described in IEEE Std 81. The complete installation shall have a total resistance to ground of not more than 25 ohms . Grounding electrodes shall be tested individually prior to connection to the system and the system as a whole shall be tested not less

than 48 hours after rainfall. When the resistance of the complete installation exceeds the specified value or two grounding electrodes individually exceed 20 ohms, the Contracting Officer shall be notified immediately.

### 3.1.2 Concrete Poles

Concrete poles shall be designed to withstand the loads specified in IEEE C2 multiplied by the appropriate overload capacity factors. Poles shall be reinforced and prestressed, either cast or spun. Spun poles shall have a water absorption of not greater than three percent to eliminate cracking and to prevent erosion. Concrete poles shall have hollow shafts. Poles shall have a hard, smooth, nonporous surface that is resistant to soil acids, road salts, and attacks of water and frost. Poles shall not be installed for at least 15 days after manufacturer. Fittings and brackets that conform to the concrete pole design shall be provided. Poles shall conform to strength calculations performed by a registered professional engineer and submitted in accordance with detail drawings portion of paragraph SUBMITTALS. Refer to section 02588N for additional information.

Each pole shall include a Class II lighting conductor, bare stranded, rope lay copper, installed in manufacture, parallel to longitudinal reinforcing steel, bonded to reinforcing steel using exothermic welds at both the top and bottom of the pole.

Poles shall be pre-drilled in manufacturer for down conductor exit holes, 3/4" diameter, one at top and one at bottom. Provide five foot service length of down conductor at base of pole, and a five foot service length at top of pole. Refer to details in drawings D1 and D2 for additional information.

### 3.2 INSPECTION & TESTING

The lightning protection system will be inspected by the Contracting Officer to determine conformance with the requirements of this specification. No part of the system shall be concealed until authorized by the Contracting Officer.

Test each pad lightning protection system as a unit in accordance with DA Pam 385-64, Appendix B, Appendix D, and Table 6-1 as shown attached.

-- End of Section --

**Table 6-1**  
**Grounding system inspection and test requirements**

Grounding system component	Visual inspection interval	Electrical test	
		Interval	Required resistance
Earth electrode subsystem <sup>2,3,4</sup> ground rods, ground loop, grid, radial, plate, cones, rail- road track, water pipes	6 months		25 ohms
Static electricity charge dissipation subsystem	Daily before use		25K to 1 Megohm
Conductive floors, mats, table, tops, plates, runners <sup>9</sup> Metal mats <sup>8,9</sup>			
Conductive footwear, in use (on wearer) <sup>9</sup> Series connection	Daily before use	6 months	25K to 1 Megohm, 1 Megohm Max
Conductive belts, Conveyor belts	Daily before use	6 months	5 Megohms max
V belts	Daily before use	At installation	600K ohms max at initial instal- lation
Conductive hoses	Daily before use	6 months	250K ohms max
Legstats <sup>9</sup>	Daily before use	Daily before use	40K to 250K
Wristats <sup>5,9</sup>	Daily before use	Daily before use	25K to 1 megohm
Forklifts <sup>6</sup> , Aircraft loading pads	12 months	12 months	10K ohms
Equipment & machinery <sup>10</sup>	Daily before use	6 months	2 ohms
Ordnance ground subsystem	6 months	24 months	25 ohms
Instrument ground subsystem	6 months	24 months	25 ohms
Lightning protection subsystem (bonding check)	6 months	24 months	1 ohm

**Notes:**

<sup>1</sup> Only visible/accessible portions of the earth electrode subsystems will be inspected.

<sup>2</sup> In addition to the regular inspection/test interval, earth subsystems will be tested after initial installation, maintenance or renovation. A three point fall of potential test is not required on earth covered magazines. The lightning protection electrical test for an earth covered magazine will consist of a bonding check only.

<sup>3</sup> The required resistance value is determined by what the earth electrode subsystem is bonded to. When more than one subsystem is bonded together, the most stringent requirement applies.

<sup>4</sup> Ground loop systems are required to exhibit a resistance to earth less than or equal to 25 ohms. When a higher resistance is measured, the test crew will perform a full three-point fall-of-potential test to determine if optimum probe locations will lower the result to an acceptable level. If the result is still above 25 ohms, the test crew will perform a four-point earth resistivity test to determine if the high reading is due to soil conditions. If high soil resistivity is the reason for the high initial reading, record this fact in the test record, and use this soil resistivity reading for a new baseline value for future tests to detect any system deterioration. If the soil resistivity is not the reason for the high resistance to earth, perform system maintenance.

<sup>5</sup> Testing of wristats shall be conducted with a wrist strap tester or an appropriate digital readout ohmmeter. Wrist strap testers shall be used in accordance with the manufacturer's instructions.

<sup>6</sup> Forklift inspection and test procedures are in TB 43-0142, Safety Inspection and Testing of Lifting Devices. (MIL-T-21869 provides procedures for testing forklift discharge straps.)

<sup>7</sup> The inspection and test procedures are found in the following appendixes: a. Appendix B, earth electrode subsystems; Appendix C, static electricity dissipation subsystems; c. Appendix D, lightning protection subsystems (bonding tests).

<sup>8</sup> Test from one point on the metal mat to ground. It may be necessary to install a resistor between the metal mat and ground to achieve the required resistance.

<sup>9</sup> When utilizing electrically energized tools/equipment (110V or 220V), ground fault interruptors (GFIs) must be installed in the electrical circuits for personnel protection.

<sup>10</sup> Equipment bonds will be visually inspected together with scheduled or unscheduled maintenance entries into the bay area for operations that are continuous (three shifts, 24 hours per day), remotely controlled, conducted in separate bays, and can potentially create toxic atmospheres within the operating bay.

## Appendix B Earth Electrode Subsystem Test and Inspection

### B-1. Introduction

This appendix provides criteria and procedures for conducting both visual inspection and electrical testing of earth electrode subsystems.

### B-2. Visual inspection criteria

The earth electrode subsystem will be visually inspected only when or where the subsystem is visible. The earth cover will not be removed from the earth electrode subsystem for the sole purpose of inspection.

- a. Components will be in good repair.
- b. Components will be free of paint or other nonconductive coating.
- c. Components will be free of corrosion. Discoloration of materials is not considered corrosion.
- d. Components will be free of breaks, cuts, and damage that will affect equipment integrity.
- e. All permanent (welded) and semi-permanent (bolted) bonds are in good condition.
- f. Components will be securely fastened to their mounting surfaces and protected against movement and damage.
- g. There have not been additions or alterations to the protected facility which would require additional protection or testing.
- h. Compression clamps are tight.

### B-3. Earth resistivity testing

The resistivity of the earth surrounding the facility should be measured using a four terminal fall-of-potential meter. The reading obtained indicates the average resistivity of the soil in the immediate vicinity of the test area. A resistivity profile of the site requires that the test be repeated at many sample locations over the region being mapped.

a. For small sites, up to 2,500 square feet (232 square meters), make at least one measurement at the center of the site and at each of the four corners of a 50-foot (15 meters) square as shown in Figures B-1 and B-2. Drive a stake or marker at the locations shown. Position the potential and current probes in a straight line with the stake or marker centered between the probes. Make a resistance measurement at each location and calculate the resistivity. Record the resistivity. Take the average of the five readings as the resistivity for the soil at the site. If possible, soil measurements should be made during average or normal weather conditions. Measurements should never be made immediately after a rain or storm.

b. For larger sites, make measurements every 100 to 150 feet (31 to 46 meters), over the site area. Include in the site area the locations of support elements such as transformer banks, towers, engine-generator buildings, and so forth. Choose a sufficient number of test points to indicate the relative uniformity of the soil composition throughout the area. Be particularly alert for the presence of localized areas of very high or very low resistivity soils.

c. A single soil resistivity measurement is made using the four-probe method in the following manner:

(1) At a location near the center of the site, insert the four short probes supplied with the earth resistance test set into the soil in a straight line as illustrated in Figure B-2. A convenient probe spacing of 6 to 9 meters (20 to 30 feet) is recommended as a start. If probes are not supplied with the test set or if they have been lost or misplaced, four metal (steel, copper, or aluminum) rods, 1/4 to 3/8 inch in diameter and 12 to 18 inches in length, may be used. Drill and tap the rod for Nos. 6-32, 8-32, or 10-24 screws, according to rod size and securely fasten the test set leads to the rods. Clamps may also be used for connecting the leads to the probes.

(2) Following the manufacturer's instruction, obtain a resistance reading,  $R$ , with the test set.

(3) Convert the probe spacing,  $A$ , to centimeters.

(4) Compute resistivity from  $p = 6.28RA$  (in ohm-cm). Example: Assume that a resistance of 2 ohms is measured with probe spacings of 20 feet. Convert 20 feet to centimeters: 20 ft. x 30.5 cm/ft. = 610 cm. Calculate resistivity:  $p = 6.28 \times 2 \text{ (ohm)} \times 610 \text{ (cm)} = 7662 \text{ ohm-cm}$ .

### B-4. Resistance to earth testing

The calculated resistance of a given earth electrode subsystem is based on a variety of assumptions and approximations that may or may not be met in the final installation. Because of unexpected and uncontrolled conditions which may arise during construction, or develop afterward, the resistance to earth of the installed earth electrode subsystem must be measured to see if the design criteria are met. In an existing facility, the resistance to earth of the earth electrode subsystem must be measured to see if modifications or upgrading is necessary. There is only one test method (the 3-point fall of potential method) that is recognized by the Army. The 3-point fall of potential method involves the

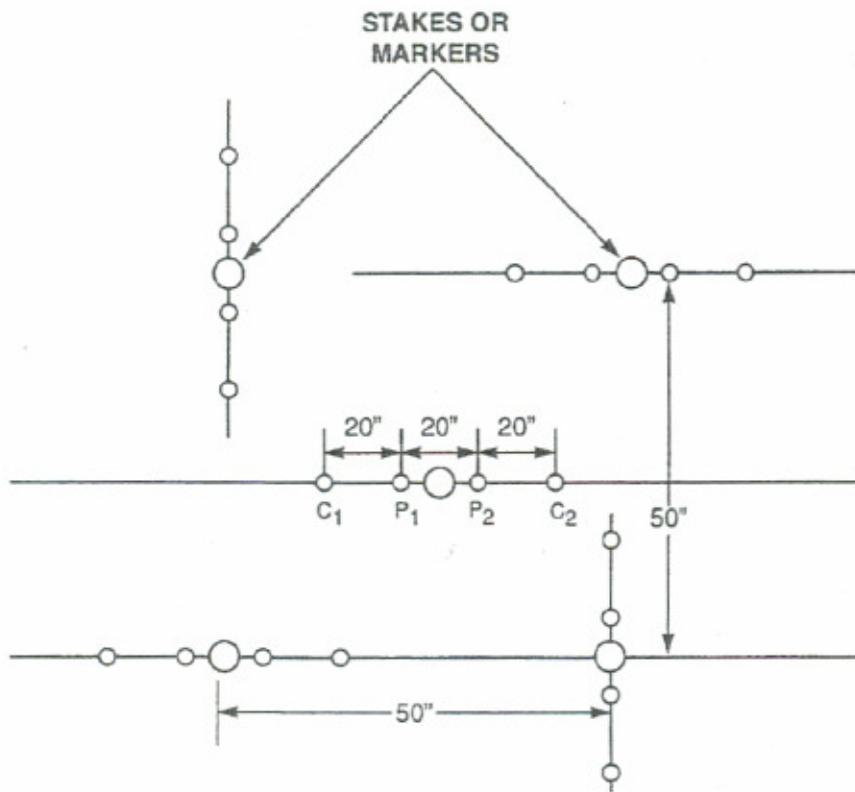
passing of a known current between the electrode under test and a current probe as shown in Figure B-3. The drop in voltage between the earth electrode and the potential electrode located between the current electrodes is then measured. The ratio of the voltage drop to the known current gives a measure of resistance.

*a. Probe spacing.* Current flow into the earth surrounding an electrode produces shells of equipotential around the electrode. A family of equipotential shells exists around both the electrode under test and the current reference probe. The sphere of influence of these shells is proportional to the size of each respective electrode. The potential probe in Figure B-3 provides an indication of the net voltage developed at the earth's surface by the combined effect of these two families of shells. If the electrode under test and the current reference probe are so close that their equipotential shells overlap, the surface voltage variation as measured by the potential probe will vary as shown in Figure B-4. Since the current flowing between the electrodes is constant for each voltage measurement, the resistance curve will have the same shape as the voltage curve. For close electrode spacings, the continuously varying resistance curve does not permit an accurate determination of resistance to be made. By locating the current reference probe far enough away from the electrode under test to ensure that the families of equipotential shells do not overlap, a voltage curve like that shown in Figure B-4 will be obtained to produce the type of resistance curve shown in Figure B-3. When the distance (D) between the electrode under test and the current reference probe is very large compared to the dimensions of the earth electrode subsystem under test, the latter can be approximated as a hemisphere, and interaction between the two electrodes is negligible. Thus the true value of resistance to earth corresponds to the ratio of the potential difference to the measured current when X is 62 percent of the distance (D) from the electrode under test to the current probe. It is important to remember that (D) is measured from the center of the electrode under test to the center of the current probe and that (D) is large relative to the radius of the electrode under test. Figure B-4 shows an example of data taken with the fall-of-potential method. The correct resistance of 13 ohms corresponds to the potential probe location of 27.4 meters (90 feet) which is 62 percent of the distance to the current probe. For a complete explanation of probe spacing see Military Handbook 419.

*b. Meters.* Meters for this type of test are manufactured with either three or four terminals. With a four-terminal meter, the P1 and C1 terminals must be interconnected and connected to the earth electrode to be tested. With a three-terminal instrument, connect terminal X to the earth electrode being tested. The earth electrode subsystem will be disconnected when practical. If the earth electrode is directly accessible, connect the C1 P1 terminals or the X terminal of the test meter directly to the earth electrode or interconnecting cable. If the earth electrode is not directly accessible, connect the C1 P1 terminal or X terminal to the lowest portion of the LPS down conductor or a structural ground connection. The driven reference probe C should be driven at the distance (D) from the electrode under test as specified in Table B-1. Potential reference probe P is then driven at a point between the earth electrode under test and probe C as specified in Table B-1. The test leads should then be connected as shown in Figure B-4. Reference probes should be driven to a three-foot depth unless an acceptable reading can be achieved with the reference probes driven to a lesser depth. Operate the test meter in accordance with manufacturer's instructions to obtain the resistance to earth reading. Record the reading.

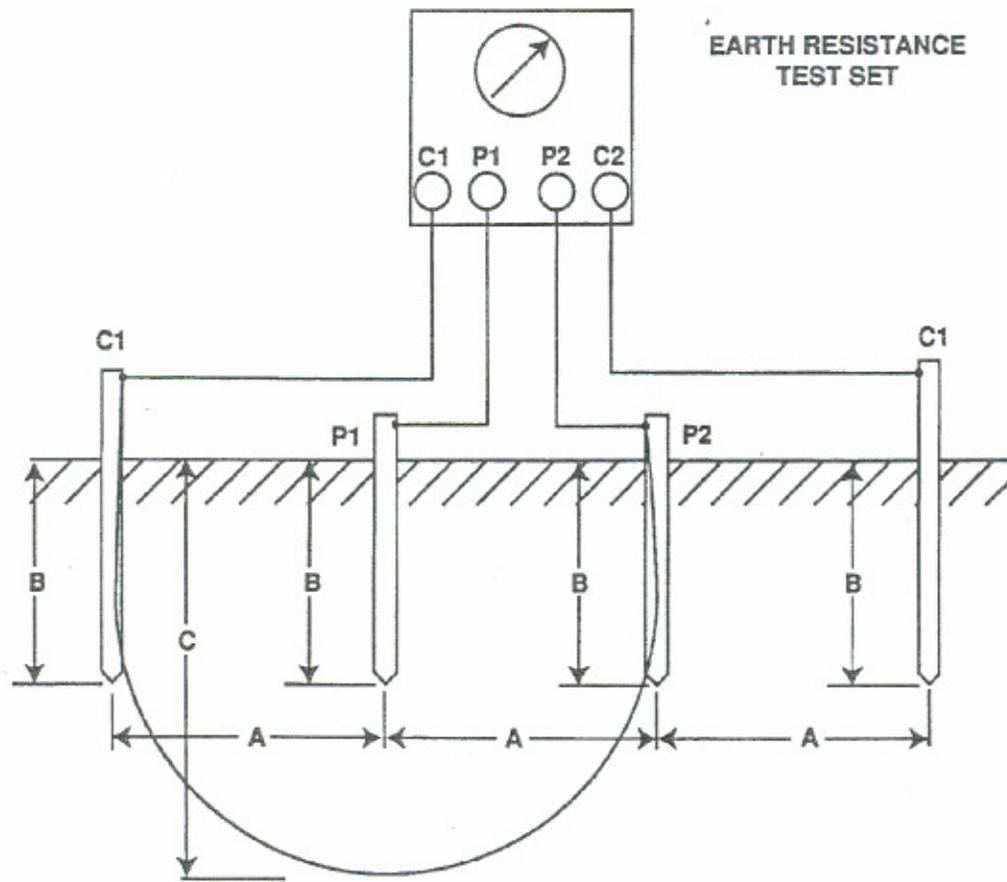
Table B-1  
 Test probe C and P distances

Earth Electrode System	Figure #	Probe C distance (D)	Probe P distance
Ground rods			
Single rod		40 meters/131 feet	25 m/82 ft
Multiple rod	6-3	40 meters/131 feet	25 m/82 ft
Ground loop/counterpoise	6-4	40 meters/131 feet	25 m/82 ft
Grid	6-6	40 meters/131 feet	25 m/82 ft
Radial	6-7	40 meters/131 feet	25 m/82 ft
Plates & cones	6-8	40 meters/131 feet	25 m/82 ft
Navy installed system	6-5	40 meters/131 feet	25 m/82 ft



**NOTE: NOT DRAWN TO SCALE**

Figure B-1. Measurement of soil resistivity



**A=ELECTRODE SPACING**  
**B=DEPTH OF PENETRATION < A/20**  
**C=DEPTH AT WHICH RESISTIVITY IS DETERMINED = A**

Figure B-2. Resistivity determination of a small site

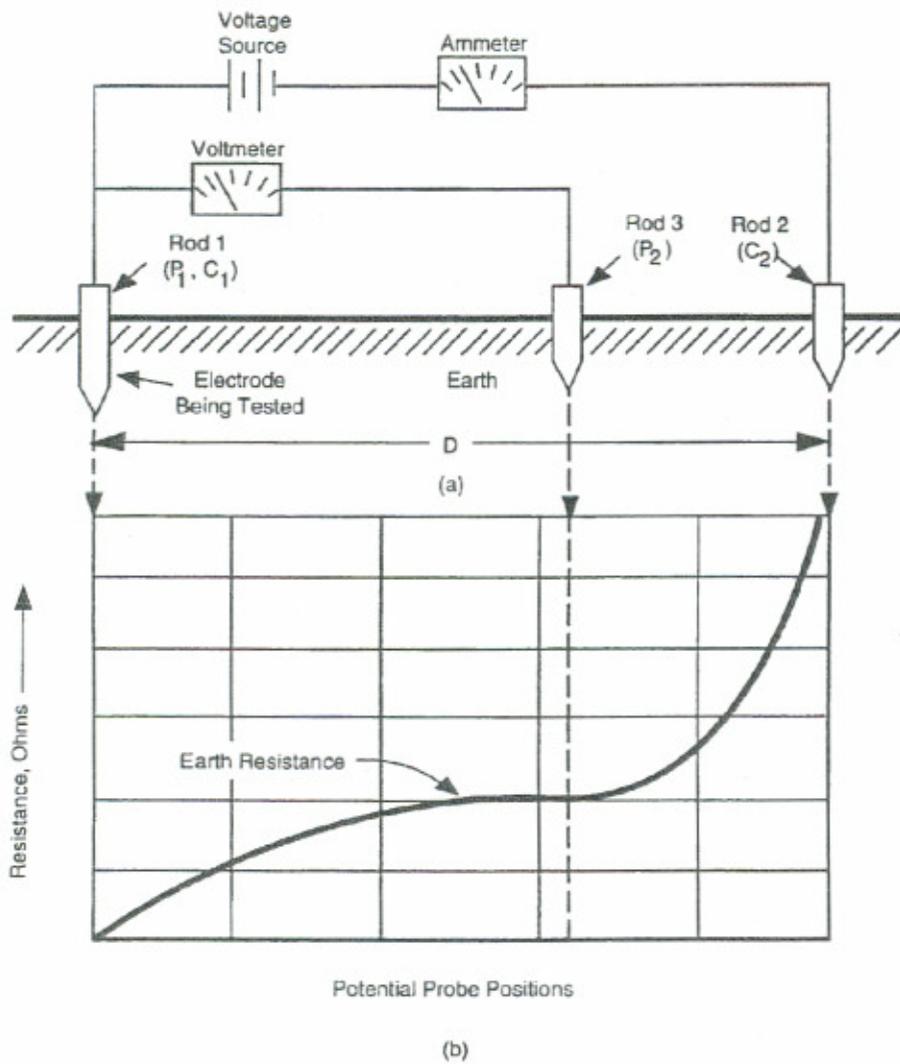


Figure B-3. Fall of potential method for measuring the resistance of earth electrodes