

# **Chesapeake and Ohio Canal National Historical Park**

**New Sewer Line Great Falls  
Maintenance Facility  
PMIS No. 98461**



**Construction Documents**

**March 2006**

## SECTION 01110

### SUMMARY OF WORK

#### PART 1 GENERAL


##### 1.1 DESCRIPTION

- A. The work of this contract consists of the general construction of construction of approximately 1400 LF of 8 inch and 360 LF of 4 inch PVC gravity sanitary sewer line and associated features.
- B. All work will be performed under a single contract.

##### 1.2 LOCATION

- A. The site is in the Great Falls, Maryland portion of the C&O Canal National Historical Park located near Potomac Maryland.

##### 1.3 CONTRACTOR'S USE OF PREMISES

- A. Construction Camp: Establishment of a camp within the park will not be permitted.
- B. The area will not be closed to the public during construction.
- C. Contractor shall at all times conduct his operations to ensure the least inconvenience to the public. Immediate work area closures will be permitted. Coordinate site requirements with the Contracting Officer Technical Representative.
- D. Confine storage of materials to contractor staging area identified on the plans.
- E. Preservation of Natural Features: Confine all operations to work limits of the project. Prevent damage to natural surroundings. Restore damaged areas, repairing or replacing damaged trees and plants, at no additional expense to the Government.
  - 1. Provide temporary barriers to protect existing trees and plants and root zones.
  - 2. Do not remove, injure, or destroy trees or other plants without prior approval. Consult with Contracting Officer and remove agreed-on roots and branches that interfere with construction.
  - 3. Do not fasten ropes, cables, or guys to existing trees.
  - 4. Carefully supervise excavating, grading, filling, and other construction operations near trees to prevent damage.
- F. Existing Utilities: Notify Contracting Officer and utility companies of proposed locations and times for excavation. 
  - 1. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.

2. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.
  3. Interruption of Existing Utility Service: The contractor shall notify the COTR and any affected customer of potential outages 48 hours in advance.
- G. Hauling Restrictions: Comply with all legal load restrictions in the hauling of materials. Load restrictions on park roads are identical to the state load restrictions with such additional regulations as may be imposed by the Park Superintendent. Information regarding rules and regulations for vehicular traffic on park roads may be obtained from the Office of the Park Superintendent. A special permit will not relieve Contractor of liability for damage which may result from moving of equipment.

#### 1.4 SPECIAL CONSTRUCTION REQUIREMENTS

- A. Holiday Work Restrictions: No on-site work shall be performed during Holidays or weekends unless approved 48 hours in advance by the COTR. All work shall be performed between the hours of 7:00 a.m. and 5:00 p.m. unless otherwise approved by the Contracting Officer.

#### 1.5 FIELD VERIFICATION

- A. Field verify all new and existing dimensions affecting the work of this contract before ordering products.

#### 1.6 CONSTRUCTION MATERIALS

- A. All other materials, including borrow and aggregates, shall be Contractor-furnished from outside the park.

#### 1.7 SALVAGED MATERIALS

- A. NOT USED.

#### 1.8 SOILS INVESTIGATION REPORT

- A. NOT USED.

PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION NOT USED.

#### PART 4 MEASUREMENT AND PAYMENT

##### 4.1 SUMMARY OF WORK

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01310

### PROJECT MEETINGS

#### PART 1 GENERAL

##### 1.1 PRECONSTRUCTION CONFERENCE

- A. Before start of construction, Contracting Officer will arrange an on-site meeting with Contractor. The meeting agenda will include the following as a minimum:

1. Park rules and regulations
2. Authorized Representatives
3. Correspondence procedures
4. Labor standards provisions
5. Payroll reports
6. Modifications
7. Payments to Contractor
8. Acceptance/rejection
9. Construction meetings
10. Subcontractors
11. Documents required under the contract
12. Submittal of shop drawings, project data, samples, and approved equals
13. As-constructed drawings/operation and maintenance (O&M) manuals
14. Saturday, Sunday, holiday and night work
15. Reference materials
16. Contractor quality control
17. Value engineering
18. Liquidated damages
19. Notice to proceed
20. Tentative construction schedule
21. Recycling Program

## 1.2 PROGRESS MEETINGS

- A. The Contracting Officer will schedule weekly meetings with the Contractor and subcontractors.
- B. Subcontractors will not be allowed to work until they have attended a meeting.
- C. Additional meetings will be held as needed or for new subcontractors.
- D. The meeting agenda will include the following as a minimum:
  - 1. Approval of minutes of previous meetings
  - 2. Review of work progress
  - 3. Field observations, problems, and decisions
  - 4. Identification of problems which impede planned progress
  - 5. Review of Contractor's Quality Control Program and activities
  - 6. Review of submittals schedule and status of submittals
  - 7. Review of off-site fabrication and delivery schedules
  - 8. Status of project record drawings (monthly)
  - 9. Status of operation and maintenance data manuals (monthly)
  - 10. Maintenance of progress schedule
  - 11. Corrective measures to regain projected schedules
  - 12. Planned progress during succeeding work period
  - 13. Coordination of projected progress
  - 14. Maintenance of quality and work standards
  - 15. Effect of proposed changes on progress schedule and coordination
  - 16. Other business relating to work

PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION NOT USED.

PART 4 MEASUREMENT AND PAYMENT

### 4.1 PROJECT MEETINGS

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

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PROJECT MEETINGS

## SECTION 01323

### PROJECT SCHEDULE AND MONTHLY INSPECTIONS

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. **Summary:** The work of this section consists of project schedule requirements including preparation of a project schedule, schedule updates, schedule revisions and time impact analysis. The project schedule shall be based upon the Critical Path Method (CPM) for planning, scheduling and reporting progress of the Work.
- B. **Purpose:** The purpose of the project schedule is to ensure adequate planning, coordination, scheduling, and reporting during execution of the work by the Contractor. The project schedule will assist the Contractor and Contracting Officer in monitoring the progress of the work, evaluating proposed changes, and processing the Contractor's monthly progress payment.
- C. **Software:** The software shall be the latest version of Primavera Project Planner (P3), SureTrak Project Scheduler, Microsoft Project, or approved equal. The Contractor shall provide to the Contracting Officer a licensed copy of the software used for the project schedule and a software reference manual. The software and reference manual will be returned to the Contractor at completion of the Contract.

##### 1.2 SUBMITTALS:

- A. As specified in Section 01330
- B. **Project Schedule:** Within 10 calendar days after Notice to Proceed, submit one electronic copy on PC compatible CD-ROM and 2 paper copies of the proposed project schedule, and accompanying CPM Schedule Reports.
- C. **Project Schedule Updates:** On or before the 7th day preceding the progress payment request date, submit estimates of the percent completion of each schedule activity and necessary supporting data. Provide two paper copies and one electronic copy.
- D. **Project Schedule Revisions and Time Impact Analysis:** Submit one electronic copy and two paper copies of a Time Impact Analysis. Each Time Impact Analysis shall include a Fragmentary Network (Fragnet) demonstrating how the Contractor proposes to incorporate a modification, change, delay, or Contractor request into the project schedule.
- E. **Schedule of Values**
  - 1. Within 14 calendar days after the date of the Notice to Proceed, submit a schedule of dollar values based on the Contract Bid Schedule. Breakdown each lump-sum bid item into component parts of work for which progress payments may be requested. The total costs for the component parts of work shall equal the bid amount for that lump-sum item. The Contracting Officer may request data to verify accuracy of dollar values. Include mobilization, general condition costs, overhead and profit in the total dollar value of unit price items and in the component parts of work for each lump-sum item, as described

below. Do not include mobilization, general condition costs, overhead or profit as a separate item.

2. Do not break down unit price bid items. Use only the bid amount for unit price items.
3. The total cost of all items shall equal the contract sum. The Schedule of Values will form the basis for progress payments.
4. An acceptable Schedule of Values shall be agreed upon by the Contractor and Contracting Officer before the first progress payment is processed.

### 1.3 PRELIMINARY REQUIREMENTS

- A. Meeting: The Contractor shall meet with the Contracting Officer on the day of the preconstruction conference to conduct a joint review of the project schedule requirements of the contract to assure the Contracting Officer of the Contractor's and subcontractors' understanding of the requirements of this section.
- B. Contractor's Schedule Representative: Before or at the preconstruction conference, designate in writing and provide the qualifications of an authorized representative in the Contractor's organization who shall be responsible for coordinating with the Contracting Officer during the preparation and maintenance of the project schedule.

### 1.4 PROJECT SCHEDULE

#### A. Schedule Development:

1. The late finish date shown on the schedule shall be the same date as the last day of the contract period.
2. The Contractor shall use the Precedence Diagram Method (PDM) with limited use of lead or lag duration's between schedule activities. The Contractor's project schedule shall consist of procurement activities (including mobilization, submittal, and the fabrication and delivery of key and long-lead procurement items) and construction activities.
3. The Contractor's project schedule shall consist of, but not be limited to, the following for each activity:
  - a. Identify each and every activity number with numerical designations (maximum 5-digit). Numbering of activities shall be in increments of 10 digits.
  - b. Concise description of the work represented by the activity (maximum 48 characters). Avoid the use of non-standard abbreviations. The work related to each activity shall be limited to one work trade.
  - c. Activity duration in whole working days with a maximum duration of 15 work days each, unless otherwise approved by the Contracting Officer, except for non-construction activities including mobilization, shop drawing and sample submittals, fabrication of materials, delivery of materials and equipment, and concrete curing.

4. In developing the project schedule, ensure that subcontractor work at all tiers, as well as the prime work, is included and coordinated in the project schedule.
5. The project schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. Ensure all work sequences are logical and the project schedule shows a coordinated plan of the work.
6. Proposed duration assigned to each activity shall be the Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity.
7. Resource loading of each activity shall list all personnel by labor category and equipment type and capacity proposed to complete the activity in the duration shown.
8. Consider seasonal weather conditions in planning and scheduling all work influenced by high or low ambient temperatures, wind and/or precipitation to ensure completion of all work within the contract time. Show anticipated weather conditions on project calendar.

**B. Joint Review, Revision, and Acceptance:**

1. Within seven calendar days of receipt of the Contractor's proposed project schedule, the Contracting Officer and Contractor shall meet for joint review, correction, or adjustment of the proposed project schedule. Any areas which, in the opinion of the Contracting Officer, conflict with timely completion of the project shall be subject to revision by the Contractor.
2. In the event the Contractor fails to define any element of work, activity, or logic, and the Contracting Officer review does not detect this omission or error, such omission or error, when discovered by the Contractor or Contracting Officer, shall be corrected by the Contractor at the next monthly project schedule update and shall not affect the contract time.
3. Within seven calendar days after the joint review between the Contractor and Contracting Officer, the Contractor shall revise and resubmit the project schedule in accordance with agreements reached during the joint review.
4. Upon acceptance of the project schedule by the Contracting Officer, the project schedule will be used to evaluate the Contractor's monthly applications for payment based upon information developed at the monthly project schedule update meeting.

**1.5 PROJECT SCHEDULE UPDATES**

- A. General: Update the project schedule on a monthly basis throughout the entire contract time and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.
- B. Procedure: The Contractor shall meet with the Contracting Officer each month at a project schedule update meeting to review actual progress made through the status date of the project schedule update, including dates activities were started and/or completed and the percentage of work completed on each activity started and/or completed. In case of disagreements at the schedule update meeting concerning actual progress to date, the Contracting Officer's determination shall govern. The schedule update meeting shall occur on the seventh day prior to the progress payment request date.



- C. Progress Payments: The monthly updating of the project schedule shall be an integral part of the process upon which progress payments will be made under this contract. If, in the judgment of the Contracting Officer, the Contractor fails or refuses to provide a complete schedule update or revision as specified hereinafter, the Contractor shall be deemed to have not provided the required information upon which the progress payment may be made, and shall be subject to retainage of a portion of the payment.

#### 1.6 PROJECT SCHEDULE REVISIONS

- A. Required Revisions: If, as a result of the monthly schedule update, it appears the project schedule no longer represents the actual prosecution and progress of the work, the Contracting Officer will request, and the Contractor shall submit, a revision to the project schedule. The Contractor may also request reasonable revisions to the project schedule in the event the Contractor's planning for the work is revised. If the Contractor desires to make changes in the project schedule, the Contractor shall notify the Contracting Officer in writing, stating the reason for the proposed revision. Accepted revisions will be incorporated into the project schedule at the next monthly schedule update.
- B. Procedure: If revision to the project schedule is contemplated, the Contractor or Contracting Officer shall so advise the other in writing at least seven calendar days prior to the next schedule update meeting, describing the revision and setting forth the reasons therefore. Government-requested revisions to the project schedule will be presented in writing to the Contractor, who shall respond in writing within seven calendar days.

#### 1.7 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS, CHANGES, DELAYS, AND CONTRACTOR REQUESTS

- A. Requirements: When contract modifications or changes are initiated, delays are experienced, or the Contractor desires to revise the project schedule, the Contractor shall submit to the Contracting Officer a written time impact analysis illustrating the influence of each modification, change, delay, or Contractor request on the contract time.
- B. Time Extensions: Activity delays shall not automatically mean that an extension of the contract time is warranted or due the Contractor. It is possible that a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the project schedule, thereby not causing any effect on the contract time. Time extensions will be granted in accordance with the terms of the contract.
- C. Float: Float is not for the exclusive use or benefit of either the Government or the Contractor. Extension of the contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the modification, change, or delay exceeds the total (positive or zero) float of a critical path activity and extends the contract completion date.
- D. Procedure: Each time impact analysis shall be submitted within the time period stated in a request for proposal, or the time period designated under the clauses entitled Changes or Default. In cases where the Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Contractor request does not require an extension of the contract time. Upon acceptance, the time impact analysis shall be incorporated into the project schedule at the next monthly schedule update.

1.8 MONTHLY INSPECTIONS

- A. Project record drawings as specified in Section 01770.
- B. Operation and maintenance data binders as specified in Section 01785.

PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION NOT USED.

PART 4 MEASUREMENT AND PAYMENT

4.1 PROJECT SCHEDULE AND MONTHLY INSPECTIONS

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01330

### SUBMITTALS

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of submittal requirements before and during construction.

##### 1.2 RELATED REQUIREMENTS

- A. Closeout submittals - Section 01770.

##### 1.3 SUBMITTAL AND APPROVAL PROCEDURES

- A. All submittals shall be transmitted using National Park Service form DSC-1(CS), dated 11/95. (A copy of the form is included at the end of this section.) No action will be taken on a submittal item unless accompanied by the transmittal form.
- B. As specified in the individual sections, forward submittals to Contracting Officer at least 14 days before need for approval. Unless a different number is specified, submit one reproducible original and two copies of each shop drawing, three copies of manufacturer's catalog sheets (cut sheets), three specimens of each sample, and three copies of all other submittals requested.
  - 1. Shop Drawings: Include the following information with each copy of shop drawings:
    - a. Date.
    - b. Date of revisions (when applicable).
    - c. Contractor's certification that shop drawing has been checked for compliance with contract documents.
    - d. Details of fabrication, assembly and erection including connections and engagement to contiguous work.
    - e. Materials used.
    - f. All required dimensions.
    - g. The term "by others" shall not be used. All work to be performed by others shall be identified by Contractor or subcontractor name, discipline, or trade.
  - 2. Samples: Samples shall be large enough to illustrate clearly the functional characteristics and full range of color, texture, or pattern.
  - 3. Manufacturers' Catalog Sheets: Submit only pertinent pages; mark each copy of standard printed data to identify specific products proposed for use.
  - 4. Manufacturer's Installation Instructions: When contract documents require compliance with manufacturer's printed instructions, provide one complete set of instructions for

Contracting Officer and keep another complete set of instructions at the project site until substantial completion.

- C. Contracting Officer reserves the right to require submittals in addition to those called for in individual sections.
- D. Approved Equals:
  - 1. For each item proposed as an "approved equal," submit supporting data, including:
    - a. Drawings and samples as appropriate.
    - b. Comparison of the characteristics of the proposed item with that specified.
    - c. Changes required in other elements of the work because of the substitution.
    - d. Name, address, and telephone number of vendor.
    - e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists. Describe availability of maintenance service, and state source of replacement materials.
  - 2. A request for approval constitutes a representation that Contractor:
    - a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
    - b. Will provide the same warranties for the proposed item as for the item specified.
    - c. Has determined that the proposed item is compatible with interfacing items.
    - d. Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.
    - e. Waives all claims for additional expenses that may be incurred as a result of the substitution.
  - 3. Construction Materials: The Contractor is encouraged to submit for approval products made out of recycled or environmentally responsible material. Every effort will be made by the National Park Service to approve these materials.
- E. Coordinate all submittals and review them for legibility, accuracy, completeness, and compliance with contract requirements. Forward submittals that are related to or affect one another as a package to facilitate coordinated review. Each transmittal shall contain only data specific to that individual submittal.
- F. Submittal Identification:
  - 1. Contracting Officer will provide a project identification stamp which shall be applied by the Contractor. Identification shall include the park name-package number, project title, contract number, and transmittal number.

2. All sets of shop drawings, manufacturer's catalog sheets, samples, and other documents submitted to the Contracting Officer must have the identification information stamped on the submittal.
3. Identification information shall be applied to the bottom right margin on each page. Identification information on samples shall be applied to the most readily visible area on the sample or on tags attached to sample.

G. Submittal Numbering:

1. Number each submittal consecutively.
2. For re-submittals use the original submittal number, plus a letter suffix beginning with A.
3. Additional re-submittals of the same item shall contain the original number with the next consecutive letter.

H. Contracting Officer's Review:

1. Submittals will be returned disapproved without technical review if identification information is missing, not filled in, or if placed on the back of the submittal; an incorrect number or format of submittals is provided; the transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Contractor's approval.
2. Any work done or orders for materials or services placed before approval shall be at the Contractor's own risk.
3. After reviewing submittals, the Contracting Officer will return one copy of form DSC-1(CS) and one copy of applicable (marked up) submittal sheets to the Contractor. Shop drawing review notations will be returned on the reproducible original shop drawing. All other submitted items will be retained. The Contractor is responsible for producing additional copies for his/her own use.
4. The returned submittal will be marked in one of three ways as defined below:
  - a. APPROVED: Acceptable with no corrections.
  - b. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. All comments are clear and no further review is required. The Contractor shall address all review comments when proceeding with the work.
  - c. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. The Contracting Officer will identify the reasons for disapproval. The Contractor shall revise and resubmit with changes clearly identified.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

PART 4 MEASUREMENT AND PAYMENT

4.1 SUBMITTALS

A. Payment will be included in the bid item to which this work relates.

END OF SECTION



## SECTION 01350

### ARCHEOLOGICAL PROTECTION

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of protecting archeological resources contained in soil deposits.

##### 1.2 DEFINITIONS

- A. Resources: Prehistoric, historic, and recent 20th century artifacts, including charcoal, human bones, ash, fire rocks, and building materials that indicate the presence of past human occupation.
- B. Archeologically Sensitive Areas: Areas that have been determined to contain significant in-the-ground archeological resources.
- C. Nonsensitive Areas: Areas that have a low likelihood of containing significant in-the-ground archeological resources.
- D. Archeological Monitor: Representative of the Government designated to record and collect cultural resources for compliance with Government regulations to protect in-the-ground resources.

##### 1.3 SUBMITTALS

- A. As specified in Section 01330
- B. 14 days before start of ground-disturbing site work, submit a Daily Work Schedule, detailing construction work in archeologically sensitive areas. Key schedule to drawings and include the following information.
  - 1. Starting and ending dates of ground-disturbing construction.
  - 2. Locations of temporary facilities, such as barriers, field offices, staging areas, sanitary facilities, borrow pits, and haul and access roads.
  - 3. Types of construction, such as clearing, topsoil stripping, structure or trench excavation, landscaping, and post construction clean-up.
  - 4. Methods and equipment used for each type of construction.
  - 5. Plan for relocating work in the event of temporary work stoppages at each archeologically sensitive area.

##### 1.4 QUALITY ASSURANCE

- A. At the pre-construction meeting, the Contractor shall meet with the Contracting Officer and the Archeological Monitor to discuss Daily Work Schedule and equipment and special methods to be used in archeologically sensitive areas. Contractor shall ensure that approved Daily Work Schedule is followed throughout construction.



## PART 2 PRODUCTS

### 2.1 BARRICADES

- A. Section 01560.

## PART 3 EXECUTION

### 3.1 BARRICADES

- A. Construct as specified in Section 01560. Locate as directed by Contracting Officer.

### 3.2 OBSERVATION

- A. Archeological Monitor will observe all ground-disturbing site work, including construction of temporary facilities, at all archeologically sensitive areas, from a safe location mutually agreed on by Contractor and Monitor. As new ground is broken, Monitor will examine excavated materials, using construction layout centerline as a reference point to record locations of findings.

### 3.3 DISCOVERY OF RESOURCES

- A. If Archeological Monitor discovers resources, immediate relocation of the work to a nonsensitive area may be required to allow Monitor to take soil samples and record resources. While Archeological Monitor is documenting resources in sensitive areas, Contractor shall relocate work to nonsensitive areas where monitoring is not normally required.
- B. If resources are discovered while Archeological Monitor is absent, stop work immediately and report the discovery to the Contracting Officer.

### 3.4 WORK STOPPAGE

- A. The Contractor shall plan, schedule, and execute the work to prevent stoppages at one area from stopping all work at the construction site.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 ARCHEOLOGICAL PROTECTION

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01360

### ACCIDENT PREVENTION

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of establishing an effective accident prevention program and providing a safe environment for all personnel and visitors.

##### 1.2 SUBMITTALS

- A. Accident Prevention Program: Before on-site work begins, submit for approval an accident prevention program. The Contracting Officer will review the proposed program for compliance with OSHA and project requirements. If the program requires any revisions or corrections, the Contractor shall resubmit the program within 10 days. No progress payments will be made until the program is approved. The program shall include:
1. Name of responsible supervisor to carry out the program.
  2. Weekly and monthly safety meetings.
  3. First aid procedures.
  4. Outline of each phase of the work, the hazards associated with each major phase, and the methods proposed to ensure property protection and safety of the public, National Park Service personnel, and Contractor's employees. Identify the work included under each phase by reference to specification section or division numbers.
  5. Training, both initial and continuing.
  6. Planning for possible emergency situations, such as floods, fires, cave-ins, slides, explosions, power outages, and wind storms. Such planning shall take into consideration the nature of construction, site conditions, and degree of exposure of persons and property.
  7. Fire Protection: Section 01510.
- B. Certificates: Provide certificates from a mechanic that all mechanical equipment has been inspected and meets OSHA requirements.
- C. Submit a copy of test reports, as required by OSHA, for personnel working with hazardous materials.
- D. Submit a report of safety meetings and of inspections.
- E. Upon request, submit proof of employees' qualifications to perform assigned duties in a safe manner.

##### 1.3 QUALITY ASSURANCE

- A. Clauses entitled "Accident Prevention" and "Permits and Responsibilities" of the contract. In case of conflicts between Federal, state, and local safety and health requirements, the most stringent shall apply. Equipment or tools not meeting OSHA requirements will not be allowed on the project sites. Failure to comply with the requirements of this section and related sections may result in suspension of work.
- B. Qualifications of Employees:
1. Ensure that employees are physically qualified to perform their assigned duties in a safe manner.
  2. Do not allow employees to work whose ability or alertness is impaired because of drugs, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury.
  3. Operators of vehicles, mobile equipment, hoisting equipment, and hazardous plant equipment shall be able to understand signs, signals, and operating instructions, and be capable of operating such equipment. Provide operating instructions for all equipment. Newly hired operators shall be individually tested by an experienced operator or supervisor to determine if they are capable of safely operating equipment.

#### 1.4 ACCIDENT REPORTING

- A. Reportable Accidents: A reportable accident is defined as death, occupational disease, traumatic injury to employees or the public, property damage by accident in excess of \$100, and fires. Notify Contracting Officer immediately in the event of a reportable accident. Within 7 days of a reportable accident, fill out and forward to Contracting Officer an Accident/Property Damage Report (Form CM-22). Form may be obtained from the Contracting Officer.
- B. All Other Accidents: The Contractor shall report all other accidents to the Contracting Officer as soon as possible and assist the Contracting Officer and other officials as required in the investigation of the accident.

### PART 2 PRODUCTS

#### 2.1 FIRST AID FACILITIES

- A. Provide adequate facilities for the number of employees and the type of construction at the site.

#### 2.2 PERSONNEL PROTECTIVE EQUIPMENT

- A. Meet requirements of NIOSH and MSHA.

#### 2.3 BARRIERS

- A. Section 01560.

### PART 3 EXECUTION

#### 3.1 EMERGENCY INSTRUCTIONS

- A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at the work site.

### 3.2 EGRESS

- A. Provide and maintain adequate egress at all times in accordance with the Life Safety Code (NFPA 101). No corridor, aisle, stairway, door, or exit shall be obstructed or used in a manner that interferes with egress.

### 3.3 PROTECTIVE EQUIPMENT

- A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair, as appropriate, personal items before issuing them to another individual.
- B. Inspect and maintain other protective equipment and devices before use and on a periodic basis to ensure safe operation.

### 3.4 SAFETY MEETINGS

- A. As a minimum, conduct weekly 15-minute "toolbox" safety meetings. These meetings shall be conducted by a foreman and attended by all construction personnel at the worksite.
- B. Conduct monthly safety meetings for all levels of supervision. Notify the Contracting Officer of meeting dates and times. These meetings shall be used to review the effectiveness of the Contractor's safety effort, to resolve current health and safety problems, to provide a forum for planning safe construction activities, and for updating the accident prevention program. The Contracting Officer will attend the meeting and enter the results of the meetings into the daily log.

### 3.5 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

- A. A hard hat area will be designated by the Contracting Officer. The hard hat area shall be posted by the Contractor in a manner satisfactory to the Contracting Officer.
- B. It is the Contractor's responsibility to require all those working on or visiting the site to wear hard hats and other necessary protective equipment at all times. As a minimum, provide six hard hats for use by visitors. Change liners before reissuing hats.

### 3.6 TRAINING

- A. First Aid: Provide adequate training to ensure prompt and efficient first aid.
- B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage. Hazardous materials are defined as explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 ACCIDENT PREVENTION

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01430

### CONTRACTOR QUALITY CONTROL

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of preparing and executing a quality control program.

##### 1.2 RELATED REQUIREMENTS

- A. "Inspection of Construction" clause of the contract.

##### 1.3 SUBMITTALS

- A. As specified in section 01330.
- B. Quality Control Plan:
  - 1. At the time of the preconstruction conference, submit for approval a written Contractor Quality Control (CQC) plan.
  - 2. If the plan requires any revisions or corrections, the Contractor shall resubmit the plan within 10 days.
  - 3. The Government reserves the right to require changes in the plan during the contract period as necessary to obtain the quality specified.
  - 4. No change in the approved plan may be made without written concurrence by the Contracting Officer.
  - 5. The plan shall include:
    - a. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
    - b. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
    - c. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
    - d. Methods of performing, documenting, and enforcing quality control of all work.
    - e. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.
- C. Contractor's Quality Control Daily Reports: Submit showing all inspections and tests on the first workday following the date covered by the report.
- D. Test Reports:

1. Submit Daily Test Information Sheets with Quality Control Daily Reports.
  2. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
  3. Submit three copies of complete test results not later than three calendar days after the test was performed.
- E. Off-Site Inspection Reports: Submit prior to shipment.
- F. If the CQC plan and Quality Control Daily Reports are not submitted as specified, the Contracting Officer may retain all payments until such time a plan is approved and implemented.
- 1.4 QUALITY ASSURANCE
- A. General:
1. The quality of all work shall be the responsibility of the Contractor. Testing shall be the responsibility of an independent testing laboratory
  2. Inspect and test all work often enough to ensure that the quality of materials, workmanship, construction, finish, and functional performance is in compliance with applicable specifications and drawings.
  3. Quality Control Daily Reports shall be completed by the Quality Control Supervisor.
  4. Test reports shall be completed by person performing the test.
  5. The Contracting Officer may designate locations of tests.
- B. Quality Control Staff:
1. The Contractor's Quality Control Supervisor may also perform the duties of Project Superintendent.
  2. The Contractor's designated Quality Control Supervisor shall be on the project site whenever contract work is in progress.
  3. The Contractor's job supervisory staff may be used to assist the Quality Control Supervisor, supplemented as necessary by additional certified testing technicians.
- C. Testing Laboratory and Equipment:
1. Employ certified independent laboratories to perform sampling and testing. The testing laboratory organization shall be certified for the type of testing work to be done.
  2. All measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with NIST requirements. Upon request, measuring and testing devices shall be made available for use by the Government for verification tests.

PART 2 PRODUCTS

NOT USED.

## PART 3 EXECUTION

### 3.1 OFF-SITE CONTROL

- A. Items that are fabricated or assembled off-site shall be inspected for quality control at the place of fabrication.

### 3.2 ON-SITE CONTROL

#### A. Notification:

1. Notify the Contracting Officer at least 48 hours in advance of the preparatory phase meeting.
2. Notify the Contracting Officer at least 24 hours in advance of the initial and follow-up phases.

#### B. Preparatory Phase: Perform before beginning each feature of work.

1. Review control submittal requirements with personnel directly responsible for the quality control work. As a minimum, the Contractor's Quality Control Supervisor and the foreman responsible for the feature of work shall be in attendance.
2. Review all applicable specifications sections and drawings related to the feature of work.
3. Ensure that copies of all referenced standards related to sampling, testing, and execution for the feature of work are available on site.
4. Ensure that provisions have been made for field control testing.
5. Examine the work area to ensure that all preliminary work has been completed.
6. Verify all field dimensions and advise the Contracting Officer of discrepancies with contract documents.
7. Ensure that necessary equipment and materials are at the project site and that they comply with approved shop drawings and submittals.
8. Prepare a report on all preparatory phase activities and discussions. Attach report to Contractor's Quality Control Daily Report.

#### C. Initial Phase:

1. As soon as work begins, inspect and test a representative portion of a particular feature of work for quality of workmanship.
2. Review control testing procedures to ensure compliance with contract requirements.
3. Prepare a report on all initial phase activities and discussions. Attach report to Contractor's Quality Control Daily Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

#### D. Follow-Up Phase: Inspect and test as work progresses to ensure compliance with contract requirements until completion of work.

#### E. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required on the same feature of work for the following reasons:

1. Quality of on-going work is unacceptable.
2. Changes occur in the applicable quality control staff, on-site production supervision, or work crew.
3. Work on a particular feature of work is resumed after a substantial period of inactivity.

### 3.3 DOCUMENTATION

- A. Maintain Quality Control Daily Reports and Daily Test Report Information Sheets (samples attached) of quality control activities and tests.
- B. Quality Control Daily Reports may not be substituted for other written reports required under clauses of the contract, such as Disputes, Differing Site Conditions, or Changes.

### 3.4 ENFORCEMENT

- A. The Contractor shall stop work on any item or feature pending satisfactory correction of any deficiency noted by the quality control staff or the Contracting Officer.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 CONTRACTOR QUALITY CONTROL

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION



# CONTRACTOR'S QUALITY CONTROL DAILY REPORT

REPORT NO.

SHEET 1 OF

PROJECT				CONTRACT NO.		DATE	
PARK				CONTRACTOR'S REPRESENTATIVE ON THE JOB			
WEATHER (Rain, Snow, Cloudy, Windy, etc.)		RAINFALL Inches	TEMPERATURE MAX. MIN.		GROUND CONDITIONS (Dry, Damp, Wet, Frozen, etc.)		
1. PRIME CONTRACTOR							
NO. EMPLOYEES BY JOB CATEGORIES		Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
					YES	NO	Comments
WORK PERFORMED BY PRIME CONTRACTOR:							
MATERIALS DELIVERED				OFFICIAL VISITORS TO SITE			
2A. SUBCONTRACTOR, _____: (If more than one subcontractor use copies of following page.)							
NO. EMPLOYEES BY JOB CATEGORIES		Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
					YES	NO	Comments
WORK PERFORMED BY SUBCONTRACTOR:							
3. SPECIFIC INSPECTIONS: (Inspections performed, results, and corrective actions)							
4. TESTING: <input type="checkbox"/> Check if any testing was performed today. (Complete and attach Test Report Information Sheets.)							
Type and Location of Testing: _____							
5. VERBAL INSTRUCTION RECEIVED FROM GOVERNMENT ON CONSTRUCTION DEFICIENCIES OR RE-TESTING REQUIRED:							
6. REMARKS:							
7. CERTIFICATION:							
I certify that the above report is complete and correct and that I, or my authorized representative, have inspected all work performed this day by the prime contractor and each subcontractor and determined that all materials, equipment, and workmanship are in strict compliance with the plans and specifications except as may be noted above.							
Contractor's Quality Control Representative							

SUBCONTRACTOR WORK CONTINUED:

CONTRACT NO.

REPORT NO. \_\_\_\_\_

SHEET \_\_\_\_ OF \_\_\_\_

## 2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:


## 2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:


## 2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	Comments

WORK PERFORMED BY SUBCONTRACTOR:


## 2 SUBCONTRACTOR,

NO. EMPLOYEES BY JOB CATEGORIES	Hours	HEAVY EQUIPMENT ON JOB	NO. UNITS	HRS. WORKING		
				YES	NO	COMMENTS

WORK PERFORMED BY SUBCONTRACTOR:


# DAILY TEST REPORT INFORMATION SHEET

CONTRACT NO. \_\_\_\_\_

REPORT NO. \_\_\_\_\_

SHEET \_\_\_\_\_ OF \_\_\_\_\_

1. Individual Making Inspection or Test: _____	
2. Testing Laboratory; Name: _____	Phone #: _____
Address: _____	
_____	
3. Description of Work and Test Method: _____	
_____	
_____	
4. Location of Samples and Tests or Inspections: _____	
_____	
5. Specification Section: _____	
6. Inspection or Test Data: _____	
_____	
_____	
7. Test Results and Interpretations of Test Results: _____	
_____	
_____	
8. Comments or Professional Opinion About Compliance of Inspected Work or Tested Work with contract Document Requirements: _____	
_____	
_____	
9. Recommendations: _____	
_____	
_____	
10. Corrective Actions Taken: _____	
_____	
_____	

## CERTIFICATION:

I certify that the above testing report is complete and correct and that all testing performed this day for this contract is in strict compliance with the plans and specifications except as noted above.

\_\_\_\_\_  
Signature of Inspector

## SECTION 01510

### TEMPORARY SERVICES

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of providing temporary services required for Contractor's performance of the work of this contract.

##### 1.2 RELATED REQUIREMENTS

- A. Section 01520 - Field Offices and Sheds.
- B. Section 01570 - Temporary Controls.

#### PART 2 PRODUCTS

##### 2.1 GENERAL

- A. Temporary materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

##### 2.2 SANITARY FACILITIES

- A. Use existing on-site facilities.

##### 2.3 FIRE PROTECTION EQUIPMENT

- A. Extinguisher shall have a minimum UL rating of 2-A:10-B:C.

#### PART 3 EXECUTION

##### 3.1 ELECTRICITY AND LIGHTING

- A. NOT USED.

##### 3.2 HEATING, VENTILATING, AND COOLING

- A. NOT USED.

##### 3.3 TELEPHONE

- A. No telephone service is available on site for Contractor's use. Contractor shall provide a cell phone to at least one of the site superintendents to facilitate site communications.

### 3.4 WATER

- A. Potable water is available from park sources.

### 3.5 SANITARY FACILITIES

- A. Use existing park facilities.

### 3.6 FIRE PREVENTION AND PROTECTION

- A. **Responsible Person:** A capable and qualified person shall be placed in charge of fire protection. The responsibilities shall include locating and maintaining fire protective equipment and establishing and maintaining safe torch cutting and welding procedures.
- B. **Hazard Control:** Take all necessary precautions to prevent fire during construction. Only store flammable or combustible liquids in approved enclosures. Provide adequate ventilation during use of volatile or noxious substances.
- C. **Spark Arresters:**
  - 1. Written determinations of periods and areas of potential fire hazard will be issued by Contracting Officer.
  - 2. Equip all gasoline or diesel powered equipment used during periods of potential fire hazards or in potential forest and grass fire locations with spark arresters approved by the USDA Forest Service.
- D. **Service and Refueling Areas:** Locate areas a minimum of 100 feet from buildings. Shut down equipment before refueling.
- E. **Smoking:** Smoking within buildings or temporary storage sheds is prohibited.
- F. **Welding:** Cutting by torch or welding shall be performed only when adequate fire protection is provided.

### 3.7 PROTECTION EQUIPMENT REQUIRED

- A. **Buildings:**
  - 1. Furnish a minimum of one extinguisher for each 1,500 square feet of area or major fraction thereof.
  - 2. Travel distance from any work station to the nearest extinguisher shall not exceed 75 feet.
- B. **Vehicles and Equipment:** Provide one extinguisher on each vehicle or piece of equipment.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 TEMPORARY SERVICES

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01560

### BARRIERS

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of furnishing, installing, and maintaining barriers to protect existing facilities and the public from construction operations.

#### PART 2 PRODUCTS

##### 2.1 GENERAL

- A. Material may be new or used, but shall be suitable for intended purpose. Fences and barriers shall be structurally adequate and neat in appearance.

##### 2.2 FENCING

- A. Safety Barrier Fence: Orange plastic fence, minimum height, 4 feet.

##### 2.3 BARRICADES AND SIGNS

- A. Manual on Uniform Traffic Control Devices (MUTCD), Part VI, 1988 edition.

##### 2.4 LUMBER

- A. Free of nails, large knot holes and splinters.

##### 2.5 BARRIER TAPE

- A. Banner Guard, imprinted with "CAUTION: CONSTRUCTION AREA", manufactured by Reef Industries, Inc., Houston, Texas, or approved equal.

#### PART 3 EXECUTION

##### 3.1 PROTECTION OF PUBLIC

- A. Fence, barricade, or otherwise block off the immediate work area to prevent unauthorized entry.
- B. Erect and maintain barricades, lights, danger signals, and warning signs in accordance with MUTCD-1988.
- C. Illuminate barricades and obstructions at night; keep safety lights burning from sunset to sunrise.
- D. Adequately barricade and post open cuts in or adjacent to thoroughfares.
- E. Protect pedestrian traffic by guardrails or fences.

- F. When pedestrian traffic is detoured onto a roadway, provide temporary walkways with protection as required at ends and overhead. For walkways, use lumber running parallel to direction of traffic movement and provide ramps at changes of elevation.
- G. Cover pipes, hoses, and power lines crossing sidewalks and walkways with troughs using beveled edge boards.
- H. Erect and maintain sufficient detour signs at road closures and along detour routes.

### 3.2 SECURITY FENCES

- A. Before starting work, coordinate closure areas and types with COTR.
- B. Locate vehicular gates to avoid interference with traffic on public thoroughfares.
- C. Locate pedestrian entrance gates as required to provide controlled personnel entry.

### 3.3 BARRIER TAPE

- A. Install where directed by Contracting Officer. Keep a minimum of two rolls on site at all times.

### 3.4 REMOVAL

- A. Completely remove barriers no longer needed when approved by Contracting Officer.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 BARRIERS

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 01720

### FIELD ENGINEERING

#### PART 1 GENERAL

##### 1.1 LAYOUT OF WORK

- A. Contracting Officer will set a base line and bench mark for each area of the work. Contractor shall lay out the work by accurately measuring from these controls. All work improperly located due to Contractor's errors or omissions shall be corrected by him at no additional expense to the Government.
- B. Contractor shall preserve controls thus established. Controls originally set by Contracting Officer that are destroyed by Contractor will be replaced by the contractor at no cost to the government.
- C. Locations and elevations shown on the drawings are subject to final field adjustment by Contracting Officer before construction. Contractor shall immediately notify the Contracting Officer of apparent errors discovered on the drawings or in the initial stakeout. If changes in stakeout are required, Contractor shall cooperate with Contracting Officer in prompt establishment of the field control for altered or adjusted work.
- D. Existing Monuments: All bench marks, land corners, and triangulation points, established by other surveys, existing within the construction area shall be preserved. If existing monuments interfere with the work, secure written permission before removing them.

##### 1.2 LAYOUT OF WORK

- A. Contractor will set initial construction stakes establishing lines, slopes, and grades for all work, and reference and base lines and bench marks for bridges and accessory structures. Contractor shall execute the work in accordance with these stakes, and perform all additional staking he deems necessary to execute the work.
- B. Contractor shall preserve controls thus established. Controls originally set by Contracting Officer that are destroyed by Contractor will be replaced by the Contracting Officer, with the cost of replacement deducted from Contractor's final payment.
- C. Locations and elevations shown on the drawings are subject to final field adjustment by Contracting Officer before construction. Contractor shall immediately notify Contracting Officer of apparent errors discovered on the drawings or in the initial stakeout. If changes in stakeout are required, Contractor shall cooperate with Contracting Officer in prompt establishment of the field control for altered or adjusted work.
- D. Existing Monuments: All bench marks, land corners, and triangulation points, established by other surveys, existing within the construction area shall be preserved. If existing monuments interfere with the work, secure written permission before removing them.

##### 1.3 QUANTITY SURVEYS

- A. NOT USED.



PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION NOT USED.

PART 4 MEASUREMENT AND PAYMENT

4.1 FIELD ENGINEERING

A. Payment will be included in the bid item to which this work relates.

END OF SECTION

SECTION 01770  
PROJECT CLOSEOUT

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work of this section consists of final cleanup, closeout submittals, and final inspection procedures.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. As recommended by the manufacturer of surface to be cleaned.

PART 3 EXECUTION

3.1 CLEANING

- A. Before scheduling the final inspection, remove all tools, equipment, surplus materials, and rubbish. Restore or refinish surfaces that are damaged due to work of this contract to original condition. Remove grease, dirt, stains, foreign materials, and labels from finished surfaces. Thoroughly clean building interiors. Pick up all construction debris from the site. At time of final inspection, project shall be thoroughly clean and ready for use.

3.2 PROJECT RECORD DRAWINGS

- A. Maintain one complete full-size set of contract drawings and one full-size set of vendor-supplied drawings. Clearly mark changes, deletions, and additions using National Park Service drafting standards to show actual construction conditions. Show additions in red, deletions in green, and special instructions in blue.
- B. Keep record drawings current. Make record drawings available to the Contracting Officer for inspection at the time of monthly progress payment requests. If project record drawings are not current, the Contracting Officer may retain an appropriate amount of the progress payment.
- C. On completion of the total project, submit complete record drawings. Include all shop drawings, sketches, and additional drawings that are to be included in the final set, with clear instructions showing the location of these drawings.

3.3 CLOSEOUT SUBMITTALS

- A. Submit before final inspection request.
  - 1. Project Record Drawings: As specified above.
  - 2. Guarantees and Bonds: As specified in individual sections.

3.4

3/1/2006

01770-1  
PROJECT CLOSEOUT

### 3.5 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

- A. When project, or designated portion of project, is substantially complete, request in writing a final inspection. Upon receipt of written request that project is substantially complete, the Contracting Officer will proceed with inspection within 10 days of receipt of request or will advise the Contractor of items that prevent the project from being designated as substantially complete.
- B. If, following final inspection, the work is determined to be substantially complete, Contracting Officer will prepare a list of deficiencies to be corrected before final acceptance and issue a Letter of Substantial Completion. Contractor shall complete the work described on the list of deficiencies within 15 calendar days, as weather permits. If the Contractor fails to complete the work within this time frame, the Contracting Officer may either replace or correct the work with an appropriate reduction in the contract price or charge for re-inspection costs in accordance with the Inspection of Construction clause of the contract..
- C. If, following final inspection, the work is not determined to be substantially complete, Contracting Officer will notify Contractor in writing. After completing work, Contractor shall request a new final inspection. All re-inspection costs may be charged against the Contractor in accordance with the Inspection of Construction clause of the contract.

### 3.6 FINAL ACCEPTANCE OF THE WORK

- A. After all deficiencies have been corrected, a Letter of Final Acceptance will be issued.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 PROJECT CLOSEOUT

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 02221

### UTILITY TRENCHING AND BACKFILLING

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of trenching and backfilling for the construction and installation of pipelines, conduits, and cables. All trenching will be open cut.

##### 1.2 SUBMITTALS

- A. As specified in Section 01330.
- B. Written procedure for trench dewatering and disposal of fluidized materials removed.
- C. Written description of barricading, shoring, cribbing, bracing, and sloping precautions.

##### 1.3 PROJECT CONDITIONS

- A. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to the public, and to minimize the possibility of trench collapse.
- B. Contractor shall furnish traffic bearing steel plates securely attached to the ground so as to minimize disruption to road and parking lot usage.

##### 1.4 EXCAVATION CLASSIFICATION

- A. Regardless of the nature of material excavated, all excavation will be considered unclassified.

#### PART 2 PRODUCTS

##### 2.1 GENERAL

- A. All backfill material shall be approved before use and be free of cinders, ashes, ice, frozen soil, large hard clods, organic debris, or other deleterious items. Trench excavation materials may be used as approved.

##### 2.2 BACKFILL MATERIAL

- A. Materials used in backfill, as shown in trench details, are defined as follows:
  - 1. Bedding (BD): When rock, unstable material, or wet trench is encountered at the excavated grade for utility installation, bedding is required. Materials shall be predominantly sand and gravel, having a plasticity index less than 6. Bedding may be omitted if, in the opinion of the Contracting Officer, the excavated trench bottom will adequately support and not damage the utility line.
    - a. BD-1: Gradation as follows:

Sieve Size	Percent Passing
No. 4	100
No. 8	55- 85
No. 40	15- 30

2. **Select Backfill (SB):** Materials shall be predominantly sand and gravel, having a plasticity index less than 6.

Sieve Size	Percent Passing
1-1/2-inch	100
1/2-inch	45- 75
No. 40	10- 25

3. **Backfill (BF):**

- a. **BF-1:** Materials shall be predominantly sand and gravel, having a plasticity index less than 6, and graded as follows:

Sieve Size	Percent Passing
1-1/2-inch	100
1/2-inch	45- 75
No. 40	10- 25

- b. **BF-2:** Soils that contain no rock larger than 6 inches at greatest dimension. If expansive clays are present, such content shall not exceed one-third of the material by volume, and shall be well mixed with noncohesive soils.

- B. ASTM D422-63 shall be used for gradation analysis. ASTM D4318-95 shall be used for determination of plasticity index.
- C. Furnish required bedding, select backfill, and backfill materials listed under the appropriate types of utility line in the sections to which this work relates.

## 2.3 UTILITY LINE MARKING

- A. All utilities shall be marked for location and identified by marking tapes, as specified in Section 02502.

## PART 3 EXECUTION

### 3.1 FIELD QUALITY CONTROL

- A. Testing required to determine compliance for the work of this section will be the responsibility of the Contractor, at no additional expense to the Government.
- B. ASTM D698-91 shall be used to determine maximum density and ASTM D1556-90 or ASTM D2922-96 shall be used to determine in-place density.
- C. The Contractor shall perform at least one test within each backfill material zone (BD, SB, BF) at the following maximum intervals. Testing at more frequent intervals may be required at the discretion of the Contracting Officer:

1. Vehicular Traffic Areas: 50 linear feet of trench.

2. Pedestrian and Lawn Areas: 100 linear feet of trench.
3. Nontraffic Areas: 200 linear feet of trench.

### 3.2 TRENCH EXCAVATION

- A. Trenching, General: Excavate the trench to the approximate level of the top of the utility line to be installed, using adequate trench width and side slopes to safely accommodate worker access. Continue excavating for the utility line, to a width not greater than is shown on the appropriate trench detail.
  1. Rocky Trench Bottom: Where ledge rock, hard pan, boulders, or sharp-edged materials are encountered, over-excavate a minimum depth of 6 inches below the bottom of the utility exterior wall to permit adequate bedding preparation. The installed utility shall have at least 6 inches of clearance from any rock protrusion. Blasting shall be as specified in Section 02114.
  2. Unstable Trench Bottom: Secure approval of depth of over-excavation and stabilization method. For wet trench construction, use approved method of dewatering through diversion, damming and pumping, well points, or underdrain systems. Dispose of removed fluidized materials as approved. Use BD-3 material to build a suitable foundation to within 6 inches of finished utility grade, prior to bedding with the specified material. Compact layers to 95 percent of maximum density in not greater than 6-inch layers. Do not proceed with utility installation until wet trench and unstable conditions are under control.
  3. Hand Excavation: Perform hand excavation of trenches dug within the drip line of selected trees as shown. Carefully excavate around all roots 2 inches in diameter and larger to ensure against damage.
- B. Paved Areas: Cut existing pavement full depth to a true line before excavation, as shown, and maintain the edge suitable for repaving. Pavement removed shall not be used as backfill.

### 3.3 SHORING AND SHEETING

- A. Construct and maintain all shoring and sheeting necessary to protect the excavation, as needed for the safety of the employees and as required by applicable State and Federal laws.
- B. For trenches over 5 feet deep, provide suitable barricades for worker protection. When work area is left open and unattended by Contractor, provide suitable barricades for public safety, regardless of trench depth.
- C. For trenches over 4 feet deep, provide suitable exit means in accordance with applicable provisions of OSHA.
- D. As directed, remove all other sheeting and shoring when safe to do so.

### 3.4 BACKFILLING

- A. Compaction:
  1. Use vibratory compactors for sand and gravel (noncohesive soils).
  2. Use mechanical tampers for sand and gravel containing a significant portion of fine-grained material, such as silt and clay (cohesive soils).
  3. Hand tamp around pipe or cable to protect the lines until adequate cushion is attained.
  4. Puddling or water flooding for consolidation of backfill or compaction by wheel rolling with construction equipment will not be permitted.

- B. Bedding: Compact the specified material to 95 percent of maximum density, at a moisture content determined to be suitable for such density. Compaction shall be to the finished utility grade.
- C. Utility Installation: Shape the trench bottom to ensure uniform contact with the full length of the installed line and remove any sharp-edged materials that might damage the line. Compaction shall be maintained beneath the line.
- D. Select Backfill: Fill by hand placement around the utility to just over half depth, and compact in a manner to ensure against lateral or vertical displacement. Place select backfill to 12 inches above the utility line by hand placement in not more than 6-inch layers. Compact each layer to 95 percent of maximum density, at a moisture content determined to be suitable for such density.
- E. Backfill: Place and compact the specified material as follows:
  - 1. Vehicular Traffic Areas: Fill and compact in 8-inch maximum layers to 95 percent of maximum density, at moisture content determined to be suitable for such density.
  - 2. Pedestrian and Lawn Areas: Fill and compact in 8-inch maximum layers to 90 percent of maximum density, at moisture content determined to be suitable for such density.
  - 3. Nontraffic Areas: Fill and compact in 8-inch maximum layers to 90 percent of maximum density, at moisture content determined to be suitable for such density.

### 3.5 SURFACE FINISH WORK

- A. Paved Areas: Replace removed paving and base course with new material of equal or better quality and of the same texture and color as the adjacent paved areas. Saw cut pavement edge to a true line and broom as needed prior to paving.
- B. Lawn Areas: Prepare the area for proper relaying of the previously removed sod. Remove trench and backfill materials from adjacent lawn areas to permit unhindered growth of grasses and safe operation of mowing equipment. Replace sod as specified in Section 02922. Sod and adjacent lawn areas that do not reestablish at the commencement of the next growing season shall be replaced at no additional expense to the Government.
- C. Open and Seeded Areas: Grade all disturbed areas to a finish ordinarily obtained from a blade grader, with no abrupt changes in grade or irregularities that will hold water.
- D. Drainage Ditches: Restore drainage ditches to appropriate line and grade, using approved surface erosion prevention techniques.
- E. Clean-Up: Prior to final inspection and acceptance, remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 UTILITY TRENCHING AND BACKFILLING

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

## SECTION 02501

### TESTING OF WATER AND SEWER LINES

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of leak testing gravity sewer lines, gravity sewer manholes, water lines, force mains, inverted siphons, and related valves and fittings. Rejected work shall be retested.
- B. Testing Methods: Gravity sewer lines - air test; manholes - water level drop test.

##### 1.2 QUALITY ASSURANCE

- A. Flow meters shall record the actual volume plus or minus 2 percent.
- B. Air test gauges shall be ANSI B40.1-80, Grade 3A (plus or minus 0.25 percent of full scale accuracy), 15 psi dial range.

##### 1.3 SUBMITTALS

- A. As specified in Section 01330.
  - 1. Accuracy certification by approved independent testing laboratories for flow meters and test gauges. Certifications shall be dated no more than 90 days before actual system testing.
  - 2. Before testing, provide the following information:
    - a. All Tests: Describe precautions that will be taken to protect system equipment that might be damaged under test pressures, and the proposed method for rerouting sewer flows where the system must remain in service.
    - b. Air Test: Describe the proposed method for testing where existing sewer service laterals enter the main being tested. Describe safety devices on air test equipment, and personnel safety precautions during air tests.

##### 1.4 PROJECT CONDITIONS

- A. Testing shall not be performed until each system has been flushed or thoroughly cleaned in accordance with procedures in the sections that describe water and sewer line installation.



## PART 2 PRODUCTS NONE.

## PART 3 EXECUTION

### 3.1 GENERAL

- A. Perform testing in the Contracting Officer's presence after backfill and proper compaction of trenches. Where lines are installed under roadways and parking areas, perform tests after completion of final subgrade preparation and prior to application of surface courses. Notify Contracting Officer at least 48 hours prior to testing.
- B. Prepare each section for testing, using adequate bracing; protect system equipment susceptible to damage by test pressures; make provision for installation of Government pressure gauge in parallel with Contractor's gauge, if so requested; and maintain services where required.

### 3.2 GRAVITY SEWER SYSTEMS

- A. Test manholes first. Plug inlet and outlet pipes and fill manhole with water to lid seat ring inside the metal frame. Let water stand for 1 hour to allow maximum absorption by manhole materials. Refill to the reference point. Run a drop test for 15 minutes. Add a measured volume of water to bring the level back to the reference point, and record the amount for each manhole. Two gallons is the maximum allowed for each manhole.
- B. Air Test: Test lines between manholes with low pressure air. Safety requires a regulator or relief valve on pressurizing equipment, set at 8 psig. No one will be allowed in manholes while there is air pressure against test plugs.
  - 1. Plug all pipe outlets to resist test pressure. Give special attention to laterals.
  - 2. Plug all other pipes in both upstream and downstream manholes and fill manholes with clear water to just above the line plugged for testing. Any bubbles appearing during the test indicate leakage past a plug or in part of the test equipment.
  - 3. Compute the test pressure by multiplying 0.43 times the elevation difference (in feet) of the upstream manhole rim and the invert of the line under test at the downstream manhole. The result is in psig and may be rounded to the nearest half psig. The test pressure shall be not less than 3.5 psig, nor more than 6.0 psig. Total line length included in any test section shall not exceed 400 feet.
  - 4. Supply air into the line until test pressure is attained. Allow at least 5 minutes for air temperature in the test section to stabilize.
  - 5. Reestablish the test pressure, and start a stop watch. Determine the time required for pressure to drop 0.5 psig.
  - 6. If the pressure does not drop during the stabilization period, and no additional air has been added, the section undergoing test will have passed without further testing.
  - 7. The pipe section will also have passed if the time observed for the pressure to drop 0.5 psig is greater than that determined by using the following table:

Pipe Size, Inches	Time
4	4 minutes 2 seconds
6	6 minutes 0 seconds
8	7 minutes 37 seconds
10	9 minutes 8 seconds
12	10 minutes 58 seconds
14	12 minutes 30 seconds
16	14 minutes 32 seconds

When a combination of more than one pipe size is under test, the calculated time for the larger pipe shall apply.

#### PART 4 MEASUREMENT AND PAYMENT

##### 4.1 TESTING OF WATER AND SEWER LINES

- A. Payment will be included in the contract unit prices for utility lines.

END OF SECTION

## SECTION 02502

### UTILITY LINE MARKING

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of furnishing and installing utility line marking.

##### 1.2 SUBMITTALS

- A. As specified in Section 01330.
- B. Samples: 24-inch strips of tape and 2 markers.
- C. Certification that the materials used in the tape fabrication meet the requirements of this section.
- D. Installation procedure if the cable is installed by plowing.

#### PART 2 PRODUCTS

##### 2.1 MARKING TAPE

- A. Capable of being inductively detected electronically.
- B. Construction: Metallic foil laminated between two layers of impervious plastic film not less than 3 inches wide. Total thickness of tape shall not be less than 0.005 inch (5 mil) plus or minus 10 percent manufacturing tolerances.
1. Film: Inert plastic. Each film layer shall be not less than 0.0005 inch thick (0.5 mil).
  2. Foil: Not less than 0.00035 inch thick (0.35 mil).
  3. Adhesive: Compatible with foil and film.
- C. Imprint: 3/4-inch or larger bold black letters.
- D. Legend: Identify buried utility line tape with imprint such as "Caution: Sewer Line Below". Repeat identification at approximately 24-inch intervals.
- E. Background Color: APWA color code and as specified below:

Color	Utility
Safety Red	Electric
High Visibility Safety Yellow	Gas, Oil, Steam, Dangerous Materials
Safety Alert Orange	Telephone, Communications, Cable Television
Safety Precaution Blue	Water System, Irrigation

Color	Utility
Safety Green	Sanitary Sewer, Storm Sewer
Safety Brown	Force Mains, Reclaimed Water, and Effluent Lines

- F. Manufacturer: Lineguard, Inc., Wheaton, Illinois; Reef Industries, Inc., Houston, Texas; Thor Enterprises, Inc., Sun Prairie, Wisconsin; or approved equal.

### PART 3 EXECUTION

#### 3.1 MARKING TAPE

- A. Install tape in backfill directly over each buried utility line as shown. Place tape by plowing or during final backfilling.
- B. Where utilities are buried in a common trench, identify each line by a separate warning tape. Bury tapes side by side directly over the applicable line.

### PART 4 MEASUREMENT AND PAYMENT

#### 4.1 UTILITY LINE MARKING

- A. Payment will be included in the contract unit prices for utility lines.

END OF SECTION

## SECTION 02531

### GRAVITY SEWER PIPING AND APPURTENANCES

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of furnishing and installing gravity sewer piping and appurtenances.

##### 1.2 DEFINITION

- A. Bedding and backfill material types (BD, SB, BF) are defined in Section 02320.

##### 1.3 SUBMITTALS

- A. As specified in Section 01330.
- B. Manufacturer's literature and certificates of compliance with the reference standards for pipe, fittings, and couplings.
- C. Manufacturer's installation instructions or guide.
- D. Written procedure for cleaning sewer lines and disposing of fluidized materials removed.

##### 1.4 PRODUCT HANDLING

- A. Delivery: Handle pipe carefully to ensure delivery at the project site in sound, undamaged condition. Contracting Officer will reject damaged pipe on site. Contractor shall replace damaged pipe at no additional expense to the Government.
- B. Storage: Do not store materials directly on the ground. Adequately support piping to prevent warpage. Use protective covers where pipe may be damaged by direct sunlight.

#### PART 2 PRODUCTS

##### 2.1 PLASTIC PIPE, JOINTS, AND BACKFILL MATERIAL

- A. Pipe:
  - 1. ASTM D3034-83, polyvinyl chloride (pvc). Minimum wall thickness, SDR 35.
  - 2. ASTM D2241-83, polyvinyl chloride (pvc). Water pressure rating of 125 psi (SDR 32.5).
- B. Elastomeric Gasket Joint: Manufacturer's standard. Integrally formed bell, push-fit, rubber gasketed joint system.
- C. Lubricant: Manufacturer's standard.

D. Bedding and Backfill: Section 02320.

1. Paved Areas: BD-2, SB-2, and BF-1.
2. Pedestrian and Lawn Areas: BD-2, SB-2, and BF-2.
3. Nontraffic Areas: BD-2, SB-2, and BF-2.

2.2 COUPLINGS FOR DISSIMILAR PIPES

- A. Transition type couplings shall be factory manufactured to ensure tight fit and smooth flow transition at the joint. Poured concrete collar and similar coupling methods will not be accepted.

PART 3 EXECUTION

3.1 GENERAL

- A. Construct the gravity sewer system, complete with appurtenances, to the lines and grades shown or established in the field.

3.2 TRENCHING

- A. Section 02320.

3.3 BEDDING

- A. Section 02320.

3.4 INSTALLATION

- A. Inspection: Inspect pipe for defects before lowering into the trench. Defective, damaged, or unsound pipe will be rejected.
- B. Laying: After the trench bottom has been properly prepared for pipe installation as specified in Section 02320, lay pipe upgrade with the spigot ends pointing in the direction of flow. Lay each length true to line and grade, to form smooth joint transitions and to prevent sudden offsets of the flow line.
- C. Cleaning: As work progresses, clear the sewer pipe interior of dirt and other debris by keeping swabs in the pipe and pulling them forward past each completed joint.
- D. Pipe Cutting: Cutting for closure or other reasons shall be done neatly by methods recommended by the manufacturer. Sharp edges shall be smoothed to prevent gasket damage.
- E. Jointing: Clean gaskets and seats of foreign materials prior to joint assembly. Apply lubricant as recommended by the pipe manufacturer.
1. Push-On Joint: Carefully insert the spigot end into the bell to prevent entry of dirt and incorrect entry angle. With suitable fork tool, crowbar, or by hand, make the joint to the insertion depth recommended by the manufacturer. When the selected pipe uses joints not

designed for full depth insertion, prevent further closure of previously completed joints by restraining movement of the installed line while making succeeding joints.

2. Mechanical Joint: Carefully center the spigot in the bell and position the gasket evenly in the seat. Tighten bolts alternately to an even torque, causing the follower gland to expand the gasket uniformly for a tight seal.
3. Plain End Jointing: Install factory made couplers in accordance with manufacturers' directions. Center the coupling collar over the joint and tighten bolts or bands evenly.

### 3.5 BACKFILLING OF SELECT MATERIAL

- A. Section 02320.

### 3.6 BACKFILLING

- A. Section 02320.

### 3.7 SEWER LINE MARKING

- A. Section 02502.

### 3.8 FINAL PIPE CLEANING

- A. Prior to testing, clean all lines to be tested by high pressure water jet or mechanical means. Remove and dispose of fluidized material as approved.

### 3.9 TESTING

- A. Section 02501.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 GRAVITY SEWER PIPE

- A. Payment will be made at the contract unit price for each size of pipe.

END OF SECTION

## SECTION 02533

### MANHOLES

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of furnishing and installation of 7 precast manholes.

##### 1.2 RELATED WORK

#### PART 2 PRODUCTS

##### 2.1 MORTAR

- A. One part portland cement, one part hydrated lime, and six parts sand.

##### 2.2 PRECAST CONCRETE MANHOLES

- A. ASTM C478.

##### 2.3 STEPS

- A. Polypropylene steps, manufactured by M. A. Industries, Peachtree City, Georgia, or approved equal. Size as shown.

##### 2.4 GROUT

- A. Neat portland cement and water.

##### 2.5 FRAME AND COVER

- A. FS RR-F-621, gray cast iron.
  - 1. Traffic: Type I, Style A, Size 24A frame; Type A, Size 24A nonventilated cover.
  - 2. Nontraffic: Type IV, Size 22 frame; Type E, Size 22 nonventilated cover.

#### PART 3 EXECUTION

##### 3.1 EXCAVATION AND BACKFILL

- A. Section 02320.

##### 3.2 MANHOLES

- A. Precast Manholes: Set in grout making watertight joints. All pipe openings shall be rubber-gasket A-lock or equivalent.



- B. Invert Channels: Smooth and semi-circular in shape, conforming to the inside of the adjacent sewer sections. Make changes in flow direction by a smooth curve of a radius as large as permitted by manhole size. Make changes in size and grade gradually and evenly. Form by one of the following methods:

1. Form directly in manhole concrete base.
2. Build up with brick and mortar.
3. Lay half sewer tile pipe in concrete.
4. Lay full sewer tile pipe section in concrete. After concrete has hardened, break off top half of section.

- C. Floors Outside Invert Channel: Smooth, with slope toward the channel of between 1 inch and 2 inches per foot.

### 3.3 FRAMES AND COVERS

- A. Install as shown, with top of cover flush with finish grade or ground surface. Grout frames to the concrete manhole section.

### 3.4 STEPS

- A. Install steps in accordance with manufacturer's recommendations and as shown.

## PART 4 MEASUREMENT AND PAYMENT

### 4.1 STANDARD MANHOLES

- A. Payment will be made lump sum.

END OF SECTION

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1 GENERAL

##### 1.1 DESCRIPTION

- A. The work of this section consists of furnishing and placing cast-in-place concrete.

##### 1.2 QUALITY ASSURANCE

- A. Work and submittals shall conform to all requirements of ACI 301-96, except as modified by the requirements of these Contract Documents. Substitute the term "Contracting Officer" for the terms "Owner," "Architect/Engineer," and "Engineer/Architect" wherever used in ACI 301-96.
- B. In addition to field reference required by ACI 301-96, provide a copy of ASTM C33-93. All references shall be available at the jobsite for use by the Contracting Officer before beginning concrete work.
- C. The Contractor shall be responsible for all concrete testing, including testing identified as being the responsibility of the "Owner" in ACI 301-96. Testing services specified in Article 1.6.4.2 are required.

##### 1.3 SUBMITTALS

- A. As specified in Section 01330.
- B. Placing Drawings: Details not shown shall conform to CRSI Manual of Standard Practice, 25th Edition. Marked copies of the contract drawings will not be accepted as placing drawings.

#### PART 2 PRODUCTS

##### 2.1 FORMWORK AND FORM ACCESSORIES

- A. NOT USED.

##### 2.2 REINFORCEMENT

- A. NOT USED.

##### 2.3 CONCRETE

- A. Cementitious Material Content: Cementitious material may be a blend of portland cement and fly ash. Minimum cementitious material content, 564 pounds per cubic yard.
  - 1. Portland Cement: ASTM C150-94b, Type II.
  - 2. Fly Ash: ASTM C618-95, Class F. Fly ash not to exceed 15 percent of total cementitious material content by weight.

- B. Quality of Concrete: Furnish concrete under Option C, ASTM C94-94, whereby the manufacturer assumes full responsibility for the selection of the proportions for the concrete mixture with the minimum allowable cement content specified.
- C. Maximum Water - Cementitious Material Ratio: 0.50.
- D. Strength: 28-day compressive strength shall be 3,000 psi.
- E. Maximum Concrete Temperature: The temperature of concrete at time of delivery shall not exceed 80 degrees Fahrenheit.
- F. Chloride Ion Content: Chlorides are not permitted.

#### 2.4 CURING MATERIALS

- A. Burlap: New and free of any contaminants.
- B. Sheet Materials: As specified in ACI 301-96.

### PART 3 EXECUTION

#### 3.1 JOINTS AND EMBEDDED ITEMS

- A. Construction Joints:
  - 1. Obtain approval for joints not shown.
  - 2. Continue all reinforcement across joints.
  - 3. Obtain bond at construction joints.

#### 3.2 PLACING OF CONCRETE

- A. Notify Contracting Officer at least 24 hours in advance of any concrete placement. Do not place concrete until Contracting Officer has accepted pre-placement activities.

### PART 4 MEASUREMENT AND PAYMENT

#### 4.1 CONCRETE WORK

- A. Payment will be included in the bid item to which this work relates.

END OF SECTION

